WILL A **£60 SMARTPHONE** OR **TABLET** DO THE JOB?

micro mart

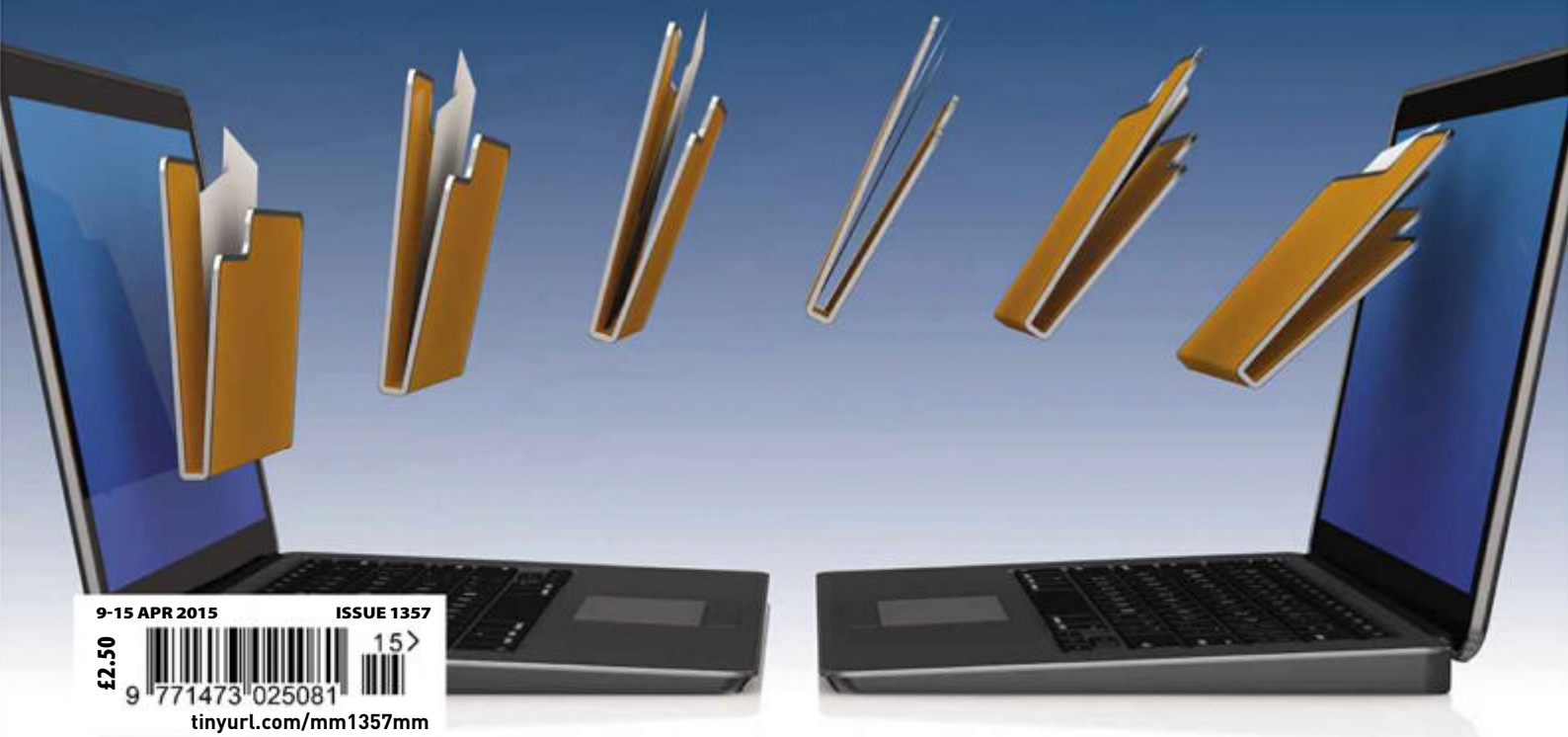
Computing in the know

Plus

- What Can An Uninterruptible Power Supply Do For You?
- How To Rid Your Web Browser Of Unwanted Add-ons
- Meet The People Teaching Game Design

THE CURRENT STATE OF BitTorrent

THE LEGALITIES
THE BEST SOFTWARE
THE BATTLE AGAINST FILE SHARERS



9-15 APR 2015 ISSUE 1357
£2.50
9 771473 025081 15
tinyurl.com/mm1357mm

CCL

www.cclonline.com

CCL Computers Ltd recommends Windows 8.1

Find your perfect PC at CCL

"Gaming Workstations Media Centre Home & Family Education Custom Builds Business & Office Find your perfect PC at CCL"

Why choose CCL for your new PC?

- FREE Next Day Delivery
- FREE Help and Support
- 3 Year Warranty as Standard

Find your Perfect PC at CCLOnline.com

With 20 years PC building experience, you can trust CCL to build your perfect PC

Home & Family PCs

Home & Family PCs from **£169.99** Inc VAT & Delivered — COVERED BY 3YR WARRANTY

Gaming PCs

Gaming PCs from **£259.99** Inc VAT & Delivered — FREE NEXT DAY DELIVERY

Business & Office PCs

Business & Office PCs from **£219.99** Inc VAT & Delivered — WITH 3YR ONSITE WARRANTY

Workstation PCs

Workstation PCs from **£429.99** Inc VAT & Delivered — WITH 3YR ONSITE WARRANTY

CCL offer a great range of PCs tailored to your individual needs from a family PC right up to a bleeding edge gaming monster! If you already know exactly what you want then speak with us about a custom PC made just for you!

call: 08000 50 10 10

visit: **www.cclonline.com/pc** email: **pcsales@cclonline.com**

find us: CCL Computers Ltd, Inmoor Road
Off Cross Lane, Bradford, BD11 2PS

Prices correct at time of going to publishing (4th Feb 2015). Images & case designs are for illustrative purposes only call for details. Monitors and desktop bundles are available separately.

CCL

www.cclonline.com

CCL specialise in desktop PC computers, laptops, notebooks, and PC components including Monitors, Printers and software

CCL
www.cclonline.com

ASUS 27" Full HD LED Monitor

"2m/s Response Dual HDMI
1920 x 1080 Resolution
LED Built in Speakers 300 cd/m2"

Embedded dual HDMI ports, stereo speakers and 2ms quick response time, VE278H delivers high quality smooth visuals.

Was £211.08 - Save £56.11
£154.97
Inc VAT & Delivered

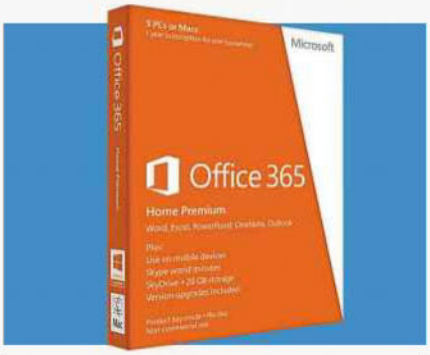
FREE NEXT DAY DELIVERY

Why not add our Monitor Checking Service for **£19.99**

A selection of deals from the 18,000+ items available from us

FREE Delivery on orders of £50, Paypal & Amazon Checkout Accepted, No hidden fees/surcharges

Microsoft Office 365 for 5 PCs



With Office 365, you can get your work done securely and communicate real-time from almost anywhere.
Includes Microsoft Word, Excel, Access Powerpoint, Publisher & OneNote

Microsoft Office 365 Home
CCL Code - SFT0403

Was £79.99
£49.97
Inc VAT with FREE Delivery

SUITABLE FOR 5 PCs FOR 1 YEAR

Wireless Network Ready

Print, copy, scan
Up to 11ipm mono / 6ipm colour print speed
Up to 6,000 x 1,200dpi print resolution
Wireless network ready
Up to 100 sheet paper capacity

Brother DCP-J132W A4 Colour Inkjet Printer
CCL Code - PRT2472

RRP £96.00 - Save £26.02
£69.98
Inc VAT

SAVE £26

Quad Core i5 Performance

Intel Core i5 Quad Core 2.8GHz CPU
8GB DDR3 1600MHz Memory, 1000GB Hard Drive, Intel HD Graphics, DVD-RW Card Reader, Wireless AC + Bluetooth
Windows 8.1 + Keyboard & Mouse

ASUS M31AD Core i5 Windows 8.1 PC System
CCL Code - SYS3796

Was £425.24 - Save £85.26
£339.98
Inc VAT

INCLUDES WIN 8 & KEYBOARD + MOUSE

many more great deals and offers online at www.cclonline.com

call: 08000 50 10 10

visit: **www.cclonline.com/pc** email: **pcsales@cclonline.com**
find us: CCL Computers Ltd, Inmoor Road
Off Cross Lane, Bradford, BD11 2PS

Prices correct at time of going to publishing (25th Mar 2015). Images & case designs are for illustrative purposes only call for details. Monitors and desktop bundles are available separately.

CCL
www.cclonline.com

Contents

This week...

08 The Current State Of BitTorrent

It's been with us for many years now, in spite of numerous BitTorrent trackers being shut down (and then usually reopened). But where are we with BitTorrent these days, and where does its future lie? David Crookes examines the state of torrenting today, as well as looking at which software is currently doing the rounds

18 Uninterruptible Power Supplies

We all know that turning off a PC's power without shutting down the operating system first is a bad idea. Sometimes, though, it can happen due to events beyond your control, such as power outages, or simply because you accidentally kicked the plug out. Either way, a UPS can help save the day. You just need to know which one to buy and whether you really need one

24 Teaching Games Design

Although it's possible to teach yourself to code and to then create a game all by yourself, a more common approach is to learn computer science at a university and then look for a job. However, many educational establishments are now teaching videogame design course, including the one that David Hayward has been checking out this week

46 External Hard Drives On Test

In this week's group test, David Hayward is looking at six different external storage solutions. Prices range from the cheap to the ridiculous, but which actually have the kind of performance and features that make them worth buying?

08 The Current State of BitTorrent

56 The £60 Mobile Challenge

These days, £60 barely pays for a meal for two in a moderately priced restaurant. Bearing that in mind, it's no surprise that it won't come remotely close to getting you a decent, brand new smartphone or tablet. It might, however, get you a pretty good second-hand one, as Ian McGurren has been finding out

62 Fix Your Browser

Ever been clicking absent-mindedly through the dialogue boxes of a software installation and accidentally installed some terrible web browser toolbar, which then proceeds to take over your entire life (well, at least the part of it that involves using a web browser)? You're not alone, but do not fret, because we're here to to tell you how to get rid of these awful add-ons

66 Spectrum To VGA

David Hayward had an old Spectrum computer that he wanted to hook up to his new TV but, as you might have guessed, they didn't share any connections he could use to do that. Undeterred, he found a solution, and he's come back to tell us all about it and show how it's done

70 Windows App Store

Over the next few weeks, Keir Thomas will be examining the major app stores to see what they have to offer and where they might be going wrong. To kick things off, he takes a closer look at the Windows Store

Also In This Issue...

74 Remembering...
We recall an unusual, and ultimately unsuccessful media PC

75 Frustrations
Sarah wonders whether keyboards can be made more user friendly

95 App Of The Week
David Hayward likes jelly and jumping, but does he like *Jelly Jump*?

Group Test
External Hard Drives
46 Transcend StoreJet 25H3
47 Lacie Christofle Sphère
48 Samsung D3 Station
49 WD Elements 5TB
50 iStorage diskAshur Pro
51 Toshiba Canvio Desktop
52 Sum up

Reviews
38 MINIX NEO X8-H Plus Android
39 Samsung 850 EVO mSATA 500GB
40 ASRock Z97 Extreme9
42 D-Link DCH-M225
43 Transcend DrivePro 220
44 Etherium

Experts
90 Ask Aaron
92 Ask Jason

Specialists
76 Linux Mart
77 Amiga Mart
78 Mobile Mart
79 Hardware Mart
80 Gaming Mart

News
32 The Latest News
53 Your Letters

Regulars
54 Subscriptions
82 Ad Index
84 IT Essentials
86 Classifieds
96 Logging Off

SAVE A BUNDLE
Subscribe to Micro Mart today and save 24% on the shop price.

Call 0844 844 0082

Basic annual rate
UK: £77.50
Europe: £185
Rest of World: £340

Online subscriber service
Change your address and renew your subscription at
www.subsinfo.co.uk
Email:
micromart@servicehelpline.co.uk

SUPERB MORGAN BARGAINS • WITH EXTRA 10% DISCOUNT!

MASSIVE COMPUTING SALE!

WITH AN EXTRA 10% DISCOUNT

Get an extra 10% OFF your new sale item or almost anything on our site!
Just visit our website today www.morgancomputers.co.uk
Enter the promotional code MMTEN at the checkout online and see your prices reduce by an extra 10%! OR call FREEPHONE 0800 008 7451 and we'll do the work for you!

WESTERN DIGITAL 1TB HARD DRIVE

- Size/Bay Height: 3.5" x 1/3H
- Capacity: 1 Terabyte • Cache (MB): 32
- Interface: Serial ATA-600
- Transfer Rate : 600 MBps
- Internal transfer Rate: 110 MBps
- Buffer Size: 64 MBps
- Spindle Speed (RPM): 7,200
- Shock Tolerance Operating: 65 g @ 2ms
- Size (WxDxH): 10.2 x 14.7 x 2.6 cm
- Weight: 0.6 kg

WD Western Digital

State of the art, top specification, top brand internal hard drive

MODEL WD10EURX 1TB

Part Code: 41663

NOW ONLY £26.96

HP 8000 ELITE SPECIAL!

Part Code: 41820

Now with an incredible 8GB DDR3 RAM, a Massive 1TB HDD, WiFi and a 1GB Graphics card the reliable and powerful 3.0GHz Core2Duo Intel processor will make short work of most tasks!

- Intel Core 2 Duo E8400/3 GHz (Dual-Core)
- 3.0 Ghz • 8GB RAM (installed)/16 GB (max)
- 1TB - SATA • DVD/CD • Stereo Sound
- Network: Wi-Fi & Gigabit LAN • Asus G210 Graphics
- Ultra Small: 33.8 cm x 37.9 cm x 10 cm
- Windows 7 Professional Operating System

TOP SPEC! LOW PRICE!

NOW ONLY £224.96

AMAZON KINDLE FIRE HDX 7" - SPECIAL BARGAIN BUY!

QUAD CORE! POWER! Wi Fi 2 GB RAM

amazon kindle BARGAIN

Instantly watch anytime on your Kindle Fire. Buy or rent from a huge selection of more TV episodes and Films than all TV channels put together. Subscribe to Prime and enjoy unlimited streaming of thousands of popular films and TV shows from Britain's largest subscription streaming service.

- Quad Core Processor
- Stunning HD display
- 1920x1200 HD Res
- 4Gb RAM/16Gb Storage
- Wi-Fi, Bluetooth, 3G/4G
- Fast web browsing
- Mojito OS
- Front-facing camera

CURRENT ARGOS PRICE ~~£254.95~~

CURRENT JOHN LEWIS PRICE ~~£264.96~~

Part Code: 41835

NOW ONLY £152.96

AVG ANTIVIRUS 2015

1 Year 1 User Download Code
Delivery Within 1 Working Day via eMail

The backbone of your PC's security system - offers protection from a range of IT threats and provides the basic tools needed to protect your PC!

Protect your computer from harmful malware and viruses with this superb AVG Anti Virus pack. This pack provides protection against spyware, trojans and phishing, as well as providing a wide range of privacy options.

AVG ONLINE PRICE ~~£23.95~~

NEW LOW PRICE!

Part Code: 411105

NOW ONLY £7.16

HP PAVILION 15.6" QUAD CORE LAPOP

Top spec full size quad core Windows 8 HP laptop with 8Gb RAM and a fast 1TB hard drive!

QUAD CORE!

- 1.6Ghz AMD A8-4555M Quad Core processor • 8Gb RAM
- 15.6" 1366 x 768 (pixels) Hi-Res Ultra Bright Screen
- 1Tb HD • Wi-Fi • Bluetooth
- Ethernet • Silver magnesium chassis
- AMD Radeon HD 7600G Graphics
- HDMI • Only 2.3kg
- Windows 8.1 OS

NOW ONLY £269.96

Part Code: 41803

BARGAIN!

PLUS! AN EXTRA 10% DISCOUNT

Buy any of these products and claim a special MicroMart readers ONLY extra 10% discount!

Go to our website and place your order for any of theses superb offers. Enter your special promo code MMTEN at the checkout online and see your order reduce by an extra 10%!

E&EO. All trademarks are acknowledged. Prices are subject to change without notice. Our terms and conditions of trading apply. Copies are available on request.

All Prices include VAT

Monday to Friday 8.30AM TO 6.00PM

MorganComputers

follow us on twitter

SUPERB MORGAN BARGAINS ● WITH EXTRA 10% DISCOUNT!

LENOVO THINKPAD T520 15.6" LAPTOP

WINDOWS 7 HOME PREMIUM, BIG SCREEN BIG SPEC - LOW PRICE!

As new top quality! This full size laptop has almost everything. 15.6" HD LED Screen, 2.5GHz 2nd Gen i5 Processor, Webcam, Windows 7 with a FREE upgrade to Windows 10 when released. Sold with a 12 month warranty for total peace of mind. Will satisfy the most demanding & fastidious customer!

- Processor: Intel Core i5 (2nd Gen) 2520M 2.5 GHz (3.2 GHz) / 4 MB Cache
- Memory: 4 GB DDR3 ● Storage: 320 GB HDD
- Display: 15.6" LED backlight 1600 x 900 / HD
- Graphics: Intel HD Graphics 3000
- Networking: Wireless, Ethernet, fax /modem, 3G upgradable
- WebCam: Built-In ● Weight: Only 2.5 kg
- Size: (WxDxH) 37.3 x 24. x 3.6 cm ● OS: Windows 7

IBM lenovo ThinkPad · Windows 7 · intel CORE i5 inside · LED · 4Gb RAM

SPECIAL NEW PRICE WITH AN EXTRA 10% DISCOUNT

NOW ONLY £269.06

APPLE iPhone 4S 16GB BLACK

Part Code: 489127

60% LESS THAN RRP!

Refurbished & Unlocked Ready for any Network SIM card!

Use on any of these networks: vodafone · O2 · EE · 3 .. and many more!

With 12 Month Warranty

- Dual-core 1 GHz Cortex-A9 processor ● 3.5" LED-backlit IPS LCD, capacitive multitouch touchscreen with 640 x 960 pixels and 16M colors ● 8 MP, HD 3264 x 2448 pixels, autofocus, LED flash primary camera ● VGA, 480p@30fps, videocalling over Wi-Fi and 3G ● Wi-Fi ● Bluetooth v4.0 ● Accelerometer, gyro, proximity & compass sensor ● GPS with A-GPS & GLONASS ● Up to 14Hr Battery Life (2G talk time) ... and much more

RRP AMAZON ~~£489.95~~

SPECIAL NEW PRICE WITH AN EXTRA 10% DISCOUNT

NOW ONLY £161.96

wi Fi 16Gb

PRICES SHOWN INCLUDE AN EXTRA 10% DISCOUNT

Buy any of these products and claim a special MicroMart readers only extra 10% discount!

Go to our website and place your order for any of these superb offers at our standard discount price. Enter your special promo code MMTEN at the checkout online and see your order reduce by an extra 10%!

E&EO. All trademarks are acknowledged. Prices are subject to change without notice. Our terms and conditions of trading apply. Copies are available on request.

Like us on Facebook

www.morgancomputers.co.uk

Or Call FREEPHONE 0800 008 7451

All Prices include VAT

Monday to Friday 8.30AM TO 6.00PM

The Current State Of BitTorrent

As BitTorrent becomes ever more popular, **David Crookes** looks at the battles against file sharers, the legalities of downloads and the best software.

There is an irritating, oft-trotted mantra that guns do not kill people, rather people kill people using guns. It's a very skewed slogan, which is roundly – and humorously – scorned on the online Urban Dictionary and in wider real life as it seeks to exploit the idea of the gun as a mere tool that merely performs the particular function asked of it by the operator.

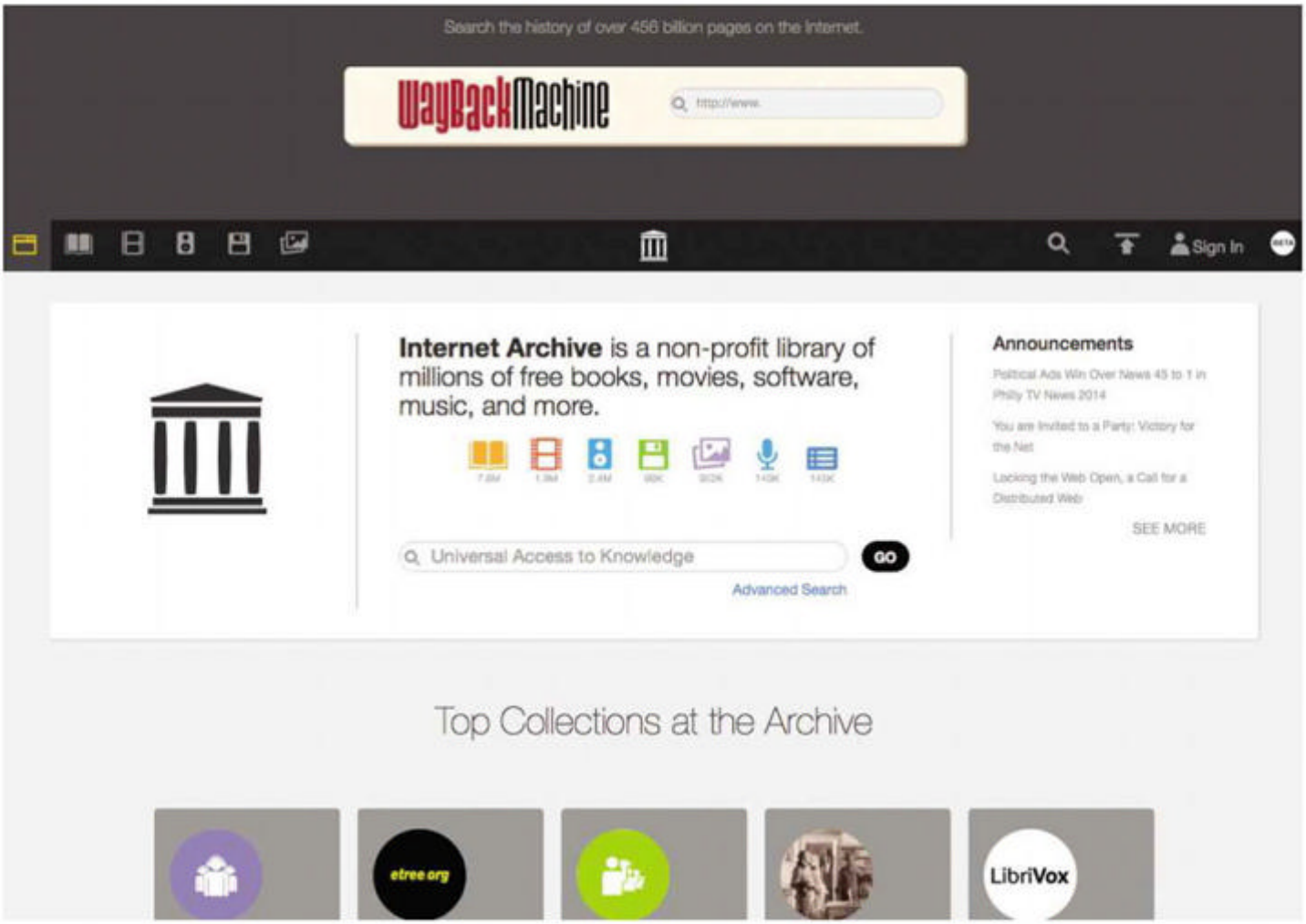
For those who use BitTorrent, a similar argument is put forward. BitTorrent is not the reason for piracy, so the point of view goes, people who use it are. But at least there is merit in this. And that's because for all of the brickbats that are thrown at BitTorrent and for all of the accusations of piracy, it does have many potential good uses. The only problem is that the bad uses get so much of the publicity.

The music and film industries have long scorned BitTorrent for allowing people to download free music. Sites such as uTorrent and the Pirate Bay, a BitTorrent hosting site billed as "the world's largest BitTorrent tracker", have long infuriated the likes of the Motion Picture Association of America and the Recording Industry Association of America by allowing people to share illegal content every day. They have blamed it for affecting their profits and disrespecting the creative output of musicians, actors and directors.

This kind of emotional blackmail has certainly helped foster a negative image of BitTorrent. Even though file sharing now makes up 6.27% of total internet bandwidth and is more popular than ever, according to Palo Alto Networks' Application Usage and Threat Report, many unnecessarily steer clear fearing that it only equates to piracy and malware.

It hasn't helped that so many companies have gone after BitTorrent users in the past, something that has led to a game of cat and mouse. Virgin Media announced in 2008 that it was going to specifically target and restrict BitTorrent traffic under a "management" policy with which the heaviest downloaders would be penalised. Lots of ISPs have followed suit to the extent that now many of them block access to torrent sites.

This has forced people to use virtual private networks to get around the ban and so, with hardcore pirates looking to avoid detection by using proxies, the



“The music and film industries have long scorned BitTorrent”

entertainment industry has gone as far as hiring monitoring agencies, some of which have uploaded files that they think will be widely downloaded and implanted them with trackers that will allow them to work out just who is falling foul of the law. According to reports in publication such as the New Scientist, “anyone who has downloaded pirated music, video or ebooks using a BitTorrent client has probably had their IP address logged by copyright enforcement authorities within three hours of doing so.”

And yet things appear to be changing. One of the first moves was made by the company BitTorrent, which announced its BitTorrent Bundle project in 2013. It aimed to legitimise torrents by allowing access to free content and giving artists and film makers the opportunity to bypass traditional means of distribution and go direct to paying customers. Part of the problem, the company said at the time, was that despite already having more than two million pieces of licensed and legal content in its ecosystem, people still saw it as a way to grab *Game of Thrones* without having to fork out for a Sky Atlantic subscription.

The first bundle was the Dada Life remix of the Kaskade track ‘Dynasty’ and the trailer for its ***Freaks of Nature*** tour documentary. By 2014, many major artists were using the service, from Madonna to Werner Herzog, and with lots of exclusive behind-the-scenes footage and the ease of using the service, it was increasing the number of visitors to such as extent that it was up to 100 million downloads and streams by the middle of June 2014. At the same time it also posed a direct challenge to iTunes, especially because some artists selling via BitTorrent were not making their work available on Apple’s platform. It has also enabled groups like De La Soul to get around copyright claims that had been applied to their work.

The BitTorrent Bundles soared in popularity last September when a well-known musician turned to it in a blaze of glory. Thom Yorke, the lead singer of Radiohead, was releasing his solo album and, while he once decried Spotify as the last desperate fart of a dying corpse, he believed BitTorrent to be the best way to go about it. By putting a price of $6 on his album and selling it in this way, he

claimed it was an attempt to bypass "the self-elected gatekeepers" of the music industry. It was immediately seized on by internet watchers as a major breakthrough.

Suddenly BitTorrent wasn't being seen as an evil at all – a tool bringing the music, game and film industry to its knees. Suddenly here was a prominent British musician heralding it as a good thing and deciding that it could be used legally, contrary to the claims that had been doing the rounds for so long. The experiment also seemed to be a resounding success, with figures suggesting Yorke had earned £13 million from the endeavour, a sum his spokeswoman later said was "totally and utterly false".

But that is beside the point. Whether or not the album did make such amounts matters little when put against the strides taken towards legitimising BitTorrents. Many creatives were hoping that it would show how BitTorrents could boost their livelihoods and, indeed, it was downloaded an impressive 4.4 million times. Figures like that make it highly likely that the experiment will be repeated.

And why not? At heart, BitTorrent is a protocol on the same lines as HTTP and FTP. File transfer protocol allows content creators to upload media for people to access and hypertext transfer protocol is the means by which files are transported to a computer and it's what allows people to view web pages in a browser.

BitTorrent is just another means of allowing quick and unlimited sharing of large files between internet users (while also being the name of a company that facilitates it). By splitting a large file into smaller bits, it is able to spread the load, so when a file is downloaded, it's pulled from multiple sources and recreated as a whole. All you need in order to facilitate this is a BitTorrent client. When you download a torrent file, data within it tells the client where it can find all of the little pieces in order to bind everything together.

BitTorrent is used by Linux users to download .iso files, and it's utilised by a host of recognisable names including Facebook and Twitter to transfer large files to thousands of locations in the shortest possible time (indeed, before Facebook began using it, Tom Cook of the company's system's engineering group, said daily code updates had proved problematic).

Without BitTorrent, the job of key services such as The Internet Archive, the organisation behind

Legal Sites

Archive.org

Archive.org is perhaps the best of them all. It is sporting a brand new look and it allows you, at the time of writing, to access 1,927,494 movies, 139,330 concerts, 2,387,054 audio recordings and 7,785,213 texts. There are curators choices and reviews from users. BitLove is also growing in popularity, offering "torrentified podcasts" with an increasing number of English-speaking offerings (many of them are in German).

bt.etree.org

For those who enjoy music, bt.etree.org is a brilliant site that enables people to share live concert recordings of trade-friendly artists. This means artists who do not mind people recording their concerts in the first place. Anyone uploading content would have to scour the pages of artists and delve into what they do and don't want people to do, but you can rest assured that you would be able to download anything from the site without any legal issues coming to the surface.

LegitTorrents.info

LegitTorrents.info is also an excellent way to find torrents that are entirely legal. It has a search engine atop some suggested downloads. You can find Linux distributions (check out **linuxtracker.org** too if you're after these), shows, movies, music, games, anime, books and apps for Windows, Linux and Mac. There's also a forum, although it is not the most bustling. Still, this is a website that goes a long way towards proving that 'torrent' does not have to be a dirty word.

PublicDomainTorrents.info

PublicDomainTorrents.info is one of our favourites. It's not much to look at, with an appearance that comes straight from the early web, but it does have an intriguing collection of B-movies and classic films that you can view in a number of formats. Sticking with the movie theme is SXSW Torrents. It's connected to South by Southwest, a music festival that has artists playing over 100 venues across Austin Texas. The websites has thousands of songs, with more than a decade's worth of torrent files of festival talent. The entire archive is as large as 55GB, and the torrents are broken down by year.

Gameupdates.org

Finally (although you can search around for many more), Gameupdates.org is brilliant for finding legal game patches for your games. It's a community-based site that allows anyone to upload and download patches, mods and games, and the search facility should be able to locate the enhancement that you're after.

GIGAREFURB

Microsoft authorised refurbisher

supplying quality refurbished **computers**, **laptops** & **peripherals**

Get the **latest tech** at **affordable prices**.

FREE NEXT DAY DELIVERY

FROM £79.99

Lenovo T410

- Intel i5 2.4Ghz Processor
- 4GB DDR3 Memory
- 320GB Hard drive
- Windows 7 Pro 64BIT

£150 ex VAT

HP 8100 Elite SFF

- Intel i5 3.2Ghz Processor
- 4GB DDR3 Memory
- 250GB Hard drive
- Windows 7 Pro 64BIT

£179.99 ex VAT

Lenovo X201

- Intel i5 2.4Ghz Processor
- 4GB DDR3 Memory
- 320GB Hard drive
- Windows 7 Pro 64BIT

£145 ex VAT

Call us today on **0161 745 9720**

or visit **www.gigarefurb.co.uk**

All our products come with **1 year warranty**

GIGAREFURB

Microsoft authorised refurbisher

Unit 5, Laundry Street, Manchester M6 6WJ **0161 745 9720** info@gigarefurb.co.uk **www.gigarefurb.co.uk**

PC Specialist recommends Windows 8.1

Performance without compromise

Infinity 7850K

- AMD A10-7850K APU
- ASUS® A88XM-PLUS
- 8GB HyperX FURY RAM
- Integrated AMD Radeon™ HD 8000
- 2TB Hard Drive
- **Windows 8.1**
- 3 Year Standard Warranty

THIS SPEC FROM £499*

Vanquish HAF III

- Intel® Core™ i5-4590
- ASUS® H81-Gamer
- 8GB HyperX FURY RAM
- 2GB NVIDIA® GeForce® GTX 960
- 120GB Kingston SSD
- 1TB Hard Drive
- **Windows 8.1**
- 3 Year Standard Warranty

THIS SPEC FROM £769*

Minerva

- Intel® Core™ i5-4690K
- ASUS® RoG MAXIMUS VII RANGER
- 16GB HyperX FURY RAM
- 4GB NVIDIA® GeForce® GTX 970
- 120GB Kingston HyperX 3K SSD
- 2TB Hard Drive
- **Windows 8.1**
- 3 Years Warranty

THIS SPEC FROM £999*

Predator X99

- Intel® Core™ i7-5820K
- ASUS® Z99-S
- 16GB HyperX FURY RAM
- 8GB AMD RADEON™ R9 295X2
- 240GB HyperX 3K SSD
- 2TB Seagate SSHD
- **Windows 8.1**
- 3 Years Warranty

THIS SPEC FROM £2,299*

Optimus V Exige

- Intel® Core™ i7-4710MQ
- 17.3" Matte Full HD LED
- 16GB HyperX IMPACT RAM
- 2GB NVIDIA® GeForce® GTX 860M
- 240GB Kingston SSD
- 1TB Hard Drive
- **Windows 8.1**
- 3 Year Standard Warranty

THIS SPEC FROM £799*

Defiance 17

- Intel® Core™ i7-4720HQ
- 17.3" Matte Full HD LED Screen
- 16GB HyperX IMPACT RAM
- 4GB NVIDIA® GeForce® GTX 980M
- 240GB Kingston SSD
- 1TB Hard Drive
- **Windows 8.1**
- 3 Year Standard Warranty

THIS SPEC FROM £1,349*

Order your system now with PC Specialist

/pcspecialist @pcspecialist

Some features require Windows 8.1. Update available through Windows Store. Internet access required; fees may apply.
Microsoft, and Windows are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

* Prices are including VAT and are correct at the time of printing, but subject to change.

pcspecialist

Award winning custom PC & Laptop manufacturer

Get a PC that's more **you**

Vortex 440

- Intel® Core™ i7-5820K
- ASUS® Z99-S
- 16GB HyperX PREDATOR RAM
- 4GB NVIDIA® GeForce® GTX 980
- 240GB Kingston HyperX 3K SSD
- 2TB Hard Drive
- **Windows 8.1**
- 3 Year Standard Warranty

THIS SPEC FROM **£1,599***

Quality builds at a low price
Always

GET A FURTHER £15 OFF WITH THIS EXCLUSIVE VOUCHER CODE:

MM49T

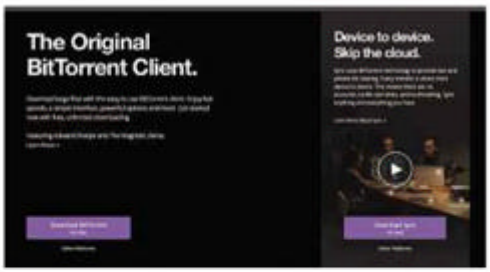
ORDER ONLINE NOW

0333 011 7000

www.pcspecialist.co.uk

There are many BitTorrent clients, but it's important to choose the right one. Going for a recognised name is the safest option, since there are some BitTorrent apps that contain viruses.

It's also worth bearing in mind that one of the first things you'll need to do when you download an app is set the software up. The clients open up a network port, which allows other clients to connect to your machine. Your computer will become part of the sharing network as a result, so make sure your security settings are well managed. So what should you download?



BitTorrent Client

You could go straight in and download the original BitTorrent Client at **bittorrent.com**. It offers free, unlimited downloading, fast delivery, a bandwidth booster and remote downloading so you can start to download something to your computer from a different location which, as the software blurb notes, is great for when you're leaving the office and getting ready to go home. There's a Pro version available too, which plays HD media inside the BitTorrent client, removes ads and provides anti-virus protection. It can also sync to many platforms from OS X to Android to Kindle Fire, Linux and more.

Vuze

Vuze is also a great choice if you want to view, publish and share top-quality video content including 1080p. It allows you to find torrents in a single click via a search engine, letting you enjoy AVI, Quicktime and Xvid files. It also lets you subscribe to content, which is great for episodic and related content. When something new appears, it will appear in the sidebar, which takes away the frustration of having to keep on top of fresh content.

Many users of Vuze love the speed of the downloads and the fact that videos play smoothly. It's possible to watch content offline and drag and drop content to an iPhone, iPod, iPad, games console and TiVo. Vuze is able to automatically detect these devices, including iTunes, so it works out the format and converts the video for you. For those who want to burn DVDs, check for viruses and remove all adverts, there is Vuze Plus.

uTorrent

uTorrent is another worthwhile download. It's a very small client that weighs in at just over a megabyte, and it runs in the background (as does Vuze), so you can get on with whatever else you're doing. What makes this app worth considering is that if gives direct access to more than 10,000 artists and two million pieces of content. All of this is entirely legal, with bundles including *Tomorrow's Modern Boxes*, the aforementioned new album by Thom Yorke.

If you want to view your files on a smartphone and tablet, then uTorrent allows you to download an Android app (Vuze is available for Android as well). This way you can play audio files and search for torrent files and magnet links. One thing to be careful of when downloading uTorrent, though, is its use of the OpenCandy installer. As you install it, the app recommends other programs that you may want. If you blindly follow the process, then chances are you will end up installing something you don't want. It won't ruin your computer, but it is an intrusion, and you will end up with the hassle of having to uninstall something.

Deluge

Finally, we come to Deluge, which you can download at **deluge-torrent.org**. It runs on Windows, Unix, OS X and Linux. Additional features can be installed via a collection of plug-ins, and you can also manage your torrents well, speeding up any downloads by fiddling with the settings. This was the first app to get around the problems of ISP throttling, which deliberately slows downloads that are being made through torrents. While this is not a standard feature for most BitTorrent clients, it still gives this app a dollop of kudos.

the Wayback Machine, would be made more difficult. People can use a BitTorrent to download items from the site, ranging from audio and video to ebooks and live concerts, all of which are in the public domain and so have no legal limitations placed on them.

The UK government has also found that **BitTorrent is an inexpensive and effective method of sharing large files with the public. In June 2010, the Treasury released torrents at data.gov.uk** that detailed how the previous government was spending the public's money. Even though the files were not actually that big (uncompressed they were between 32 and 78MB), officials said BitTorrent was the best way to send large files to large numbers of people across the internet, since it allows savings on bandwidth costs and it speeds up download.

This has certainly not been lost on the commercial world. Gamers seeking the likes of *World of Warcraft* download a BitTorrent client, and that's because Blizzard's Downloader is based on the BitTorrent open source. It allows the company to distribute content and patches. The record label Sub Pop uses BitTorrent to distribute demos and live videos. Even broadcasters have got in on the act. The Norwegian Broadcasting Corporation has allowed online BitTorrent distribution of its programming.

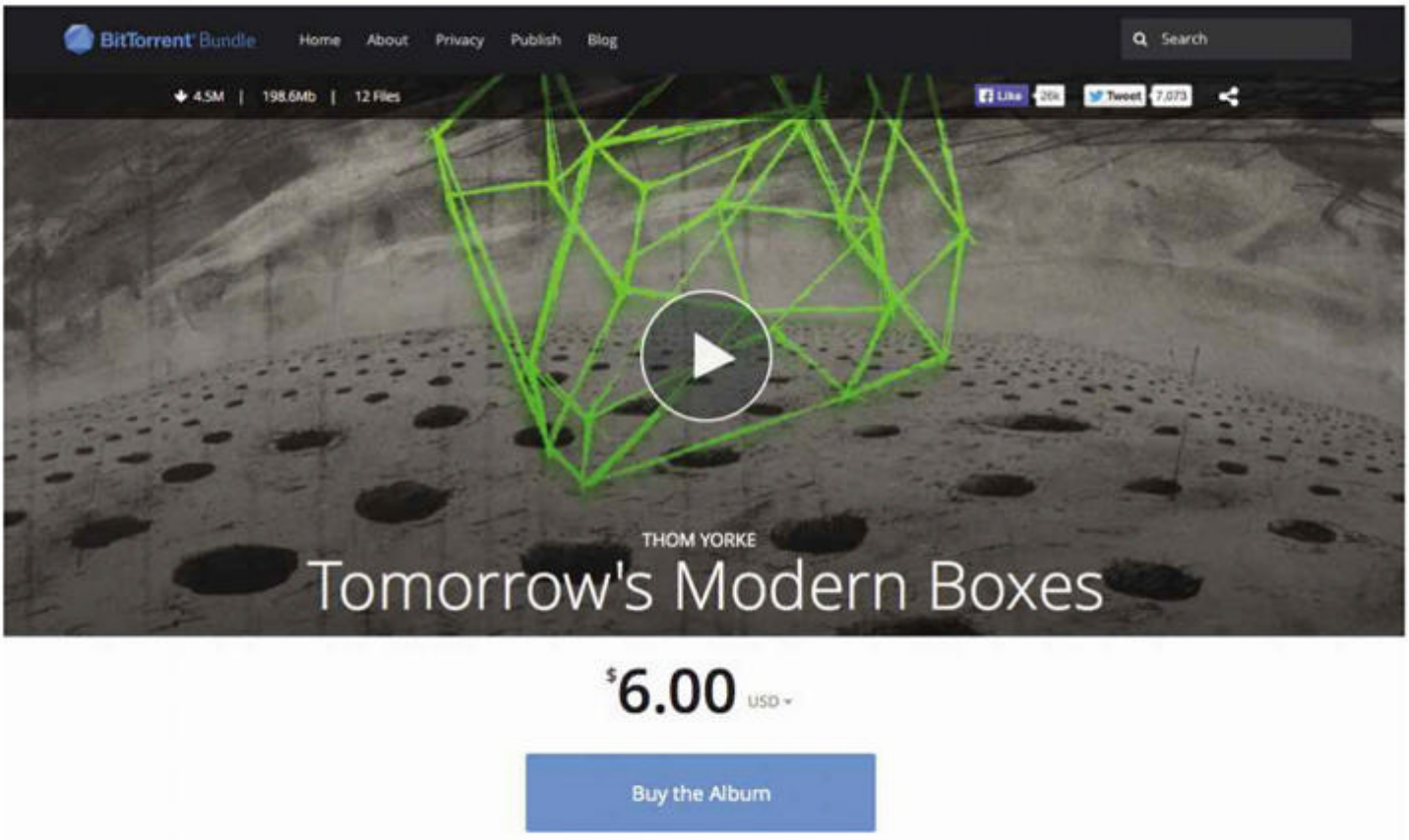
Legalities

So what are the legalities of using BitTorrents? As you can probably guess, using a BitTorrent client in and of itself is no more illegal than browsing on a website or using a FTP program. It all depends on what's being downloaded. This is usually very clear. If you happen on a blockbuster movie that has been released in the recent past or even ahead of it appearing in the cinema, then common sense dictates that it is illegal. There will be a copyright issue over the file, and by downloading it rather than purchasing it, you're committing an offence.

This can lead to legal problems. Some of the major industry organisations will pursue BitTorrent downloaders through the courts, a costly and time-consuming business that would inevitably cause some stressful hair loss. But last year, the ISPs spelt out their course of action against people who are believed to be illegally downloading entertainment files.

A deal was struck between four of the UK's largest ISPs with the BPI and Motion Picture Association, which starts with a strongly worded letter and then leads to three more should any of them be ignored.

> **"The BitTorrent Bundles soared in popularity last September when a well-known musician turned to it in a blaze of glory"**



This, they hope, will go some way to tackling an issue that, at the last count, has seen the average person download 2,900 music files and 90 films.

The procedure is clear. The rights holder must identify the IP address of a device being used to download files illegally, and they will do this by using software to monitor activity on torrent networks. If an alleged infringement is identified, then the rights holder is able to pass the information to the ISP in the form of a Copyright Infringement Report. The ISP will not give the rights holder any identifying information about an illegal download but it will write to them.

The number of overall letters that can be sent out by an ISP is 2.5 million, and the scheme is due to be reviewed in 2017. Should the scheme be found to be unworkable, it is likely the industries will push for sterner measures, although given that it took four years for the two sides to come to this agreement, a more permanent solution is likely to be some way off.

That doesn't mean that people can feel they can relax, throw a few letters in the bin and carry on as normal, perhaps behind a proxy, though. The moral thing to do would be to look for the legal BitTorrent websites, and there are indeed plenty of those. These will only contain files that are legal to share and download and, far from being filled with rubbish, there are some gems to be had (check our boxout for some starting points).

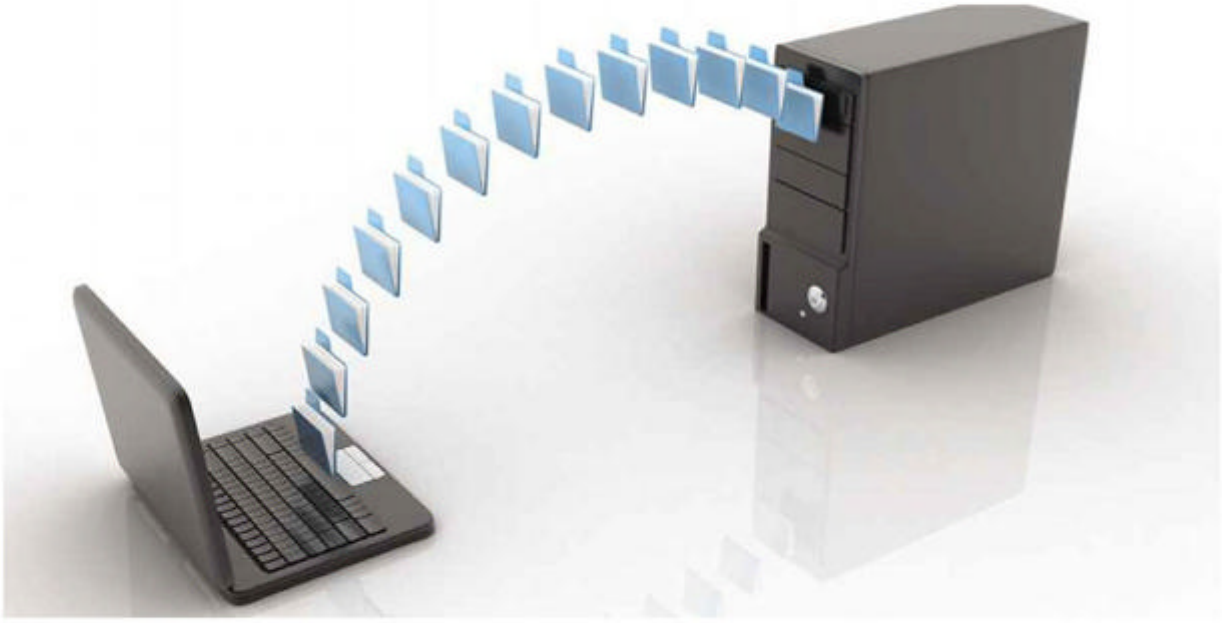
"There are people who want to stay in their pyjamas and watch a movie on their laptop"

And yet even though these websites exist and despite there being some brilliant apps around and lots of legitimate content, some rogue services continue to spoil the party. In the last couple of weeks, Spain ordered service providers to block access to the Pirate Bay (but users simply changed their DNS settings from the one provided by the ISP to another and said OpenDNS and Google DNS worked well).

Denmark blocked popular file sharing sites such as KickassTorrents last month, alleging that they were allowing pirated downloads. Denmark had tried to block the Pirate Bay – a site that many UK ISPs will not allow access to – but it was unsuccessful. One of the problems is that BitTorrent portals can switch from one domain to another and so remain one step ahead of the ISPs and their attempts to bring them down. It frustrates anti-piracy groups like the Rights Alliance, and it also brings a badge of honour to BitTorrent portals, with one administrator telling a Torrent Freak reporter, "Blocking is the greatest thing that can happen to your site."

Even so, it remains a growing and popular distribution method. Drafthouse Films told the latest SXSW festival that it was releasing its latest feature on BitTorrent – horror-romance *Spring* – and the reasons for doing so are compelling. Its co-founder Tim League is quoted as saying, "There are people who want to go out, there are people who want to stay in their pyjamas and watch a movie on their laptop. I'm a big advocate of trying to make our content available wherever people are consuming content. If you're an iTunes loyalist and want to see our content there, I want it to be there. If you get your content on BitTorrent, I think it's interesting for us to be in that space as well."

Pretty soon, like the MP3 service Napster before it, torrents will be as common and as legal as all of the other methods of distribution, and the negative connotations will have slipped away. It's a good time to download a client if you haven't already done so and explore the world of files that await you out there. You may be surprised at what you will discover. **mm**



AWARD WINNING COMPUTER SPECIALISTS

DESIGN YOUR OWN DREAM GAMING PC ONLINE TODAY

www.falconcomputers.co.uk - Tel: 0191 5676669

CELEBRATING 20 YEARS ANNIVERSARY 1995 2015

PHANTOM X9

CELEBRATING 20 YEARS ANNIVERSARY

FACLON RECOMENDS AOC IPS DISPLAYS

EDITOR'S CHOICE micro mart

KIT GURU MUST HAVE

CUSTOM PC APPROVED

RECENT AWARDS

The Falcon Phantom Elite X9 20 YEAR ANNIVERSARY Special Edition Gaming PC - Full Of Advanced Features.

Case: NZXT 340 Mid Tower (Black or White Choice)
Board: Intel Z97 Mainboard
CPU: Intel I5 4690k 3.5Ghz
RAM: 8GB DDR3 Gaming Memory
GFX: Asus Strix Edition Nvidia GTX 970
SSD: 120GB FAST SSD Boot Drive
HDD: 2TB Seagate 7200RPM - 64Mb
PSU: 500w Thermaltake PSU Bronze 80+
OS: Microsoft Windows 8.1 64Bit
Warranty: 2 Year Parts 3 Year Labour
*AOC IPS 1080P Monitor Is An Optional Extra

AOC

FALCON 2 YEAR WARRANTY

FROM ONLY **£899.99** INCLUDING VAT

WWW.FALCONCOMPUTERS.CO.UK

UNLOCKED FX PROCESSOR AMD — AMD A10 ELITE QUAD-CORE FREE GAME

FALCON 2 YEAR WARRANTY — intel — Devils Canyon

FALCON 2 YEAR WARRANTY — intel — Devils Canyon

FALCON 2 YEAR WARRANTY — intel — Devils Canyon

CUSTOM PC APPROVED

Falcon Galaxy Value Gaming PC

AMD 6600K Quad Core 3.9Ghz
ASUS A55BM-E Mainboard
8GB DDR3 1600 Memory
Corsair Spec 01 Case
1TB 7200RPM HDD
AMD R7 APU Graphics (Upgradable)
500W Bronze 80+ PSU
Microsoft Windows 8.1
Quick Find Code: VALUE-RIG-11

£399.99 UNLOCKED FX PROCESSOR AMD

Falcon Phantom Elite Gaming PC

Intel i5-4690K 3.50Ghz Devils Canyon
ASUS Z97 Mainboard
8GB DDR3 Memory
NZXT 410 White Gaming Case
1TB 7200RPM HDD
3Gb AMD Radeon R9 280X
550W FSP Silver 80+ PSU
Microsoft Windows 8.1
Quick Find Code: ELITE-BR7

£829.99 intel inside CORE i5

Falcon G8 Raider Elite Gaming PC

Intel i5-4690K 3.50Ghz Devils Canyon
Gigabyte Z97-DS3H Mainboard
8GB DDR3 Memory
Aerocool Dead Silence Gaming Case
120GB SSD + 1TB 7200RPM HDD
2GB Nvidia GTX 960
550W FSP Silver 80+ PSU
Microsoft Windows 8.1
Quick Find Code: G8 Sniper

£869.99 intel inside CORE i5

Falcon Core 51 Gaming PC

Intel I5-4690K 3.50GHz Devils Canyon
Gigabyte Z97-Gaming 7 1150 Mainboard
16GB DDR3 1600 memory
Thermaltake Core V51 Gaming Case
240GB SSD + 2TB 7200RPM HDD
ASUS Nvidia GTX 970 Strix Edition
630W Thermaltake Modular PSU
Microsoft Windows 8.1
Quick Find Code: PRO-VE2

£1199.99 intel inside CORE i5

ASUS GOLD PARTNER

GIGABYTE TECHNOLOGY

COOLER MASTER

CUSTOMISE YOUR DREAM PC TODAY
WWW.FALCONCOMPUTERS.CO.UK
190-206 Roker Avenue, Sunderland, SR6 0BN

All prices correct at time of printing but may change without prior notice, All terms and promotions are subject to availability. All images are for illustrative purposes only. All trademarks are property of there respective Owners. Falcon Computers 2 Year Warranty covers PC Hardware on selected PCs. See Website for More details.

What Is An Uninterruptable Power Supply?

James Hunt examines a piece of kit that could save you a whole lot of trouble if the worst happens

If you've ever accidentally kicked the plug socket or tripped over the power cable of your PC, you'll probably know that a sudden unexpected power-down can have dramatic consequences – particularly when it comes to hard drives, which can be accidentally wiped or actively damaged by a sudden power cut.

Of course, even if your PC isn't damaged by unplanned power loss, it can throw other spanners into the works. Maybe a long process you've been running for days is lost, or maybe your plan to remotely access your system while away is thwarted. Whether it's a circuit breaker being tripped, a wider power cut or human error, losing power to your system is always inconvenient. And if you want to prevent it, an uninterruptible power supply is the way to do it.

What Is A UPS?

When used domestically or in offices, uninterruptible power supplies are designed to provide continuous power when the mains supply becomes unavailable. Rather than generating their own power, UPS devices contain batteries, which are charged during normal use and then begin to discharge if the power supply is cut off. In a computing context, they're usually aimed at businesses, where server stability is crucial to providing continuous operation, but in recent years they've become affordable and compact enough to have in the home.

APC Smart UPS X rackmount

Domestic uninterruptable power supplies work on the basis that most power interruptions don't last for very long, and they only support a useful power output for a few minutes. This does give you the ability to either restore power without losing any of your work or safely power down your system should the interruption last longer than average.

It should be noted that they aren't intended to replace a mains supply for extended periods. UPS devices only store a limited amount of power, so it's important to decide what devices

to run off one and to be aware of the power they draw. Attach too many devices, and the UPS will discharge its stored power too quickly, making it ineffective for its intended purpose.

The power rating of the UPS will be given in both volt amps and watts, so you need to take account for the power draw needs of your system (or systems). Ensuring the UPS has 25% of additional capacity over your immediate requirements will give it plenty of room to charge while delivering power to the devices it supplies, and give it room to lose capacity due to natural aging of components. UPS devices for industrial and commercial use may be capable of powering entire buildings, but the average domestic UPS is rated at just a few hundred volt-amperes, which is enough to power a single computer system for a few minutes.

Although the primary function of a UPS is to provide continuous power, the way they work also means that they're able to smooth out surges, sags and spikes to provide a 'clean' (meaning consistent) power supply. The result of this is that systems are protected from surges that could damage components and interrupt normal usage. Indeed, if your system is overclocked you might be particularly vulnerable to power surges, because overclocked CPUs require a very clean power supply to maintain their finely tuned operation.

APC BE400-UK

"Domestic uninterruptable power supplies work on the basis that most power interruptions don't last for very long"

Choosing A UPS

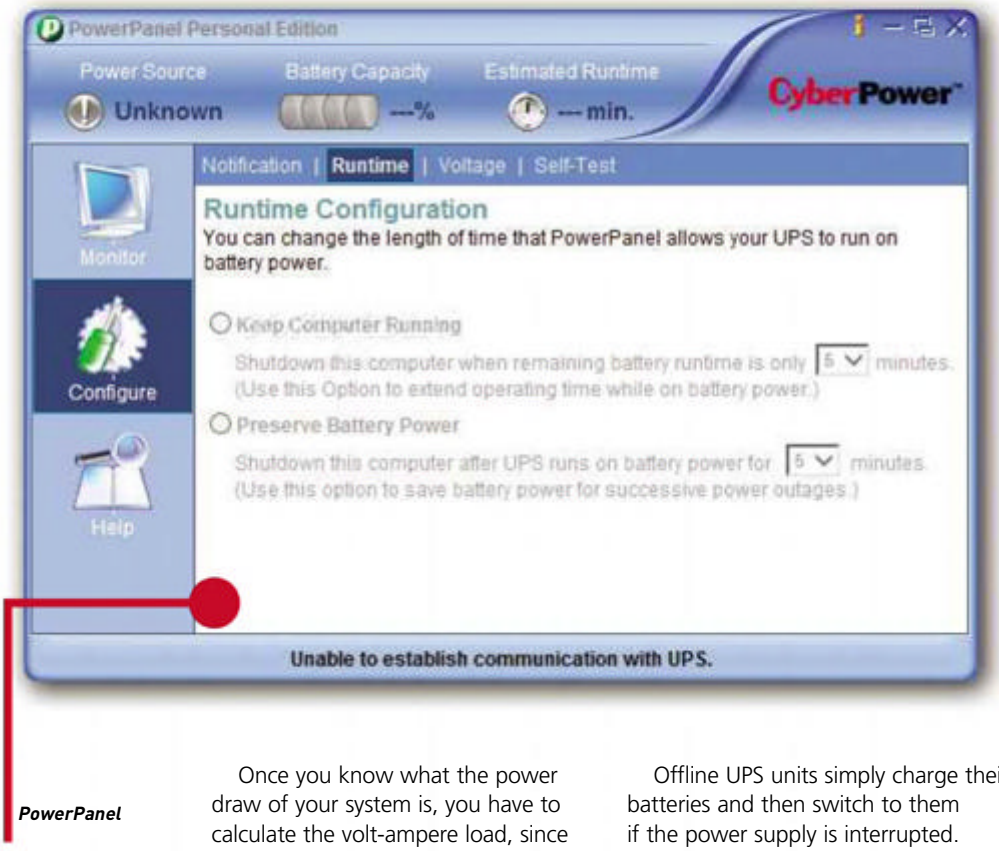
UPS devices can be deployed in a large number of contexts, which means the market has a huge range. Broadly speaking, the market can be divided up into 'tower' units (which are stand-alone, self-contained devices) and 'Rackmount' units, which are customisable devices designed to sit alongside server PCs in racks. This isn't a particularly good distinction, however, as a tower unit might describe a small under-desk device designed to keep a single system in operation or a unit the size of a large fridge-freezer intended to support an entire office.

If you're buying a UPS for domestic purposes, you're most likely looking at a low-end tower unit, which will cost anything from £50 to £500. Before you make a decision, you have to decide what your power requirements are, so you can ensure you buy a UPS that can provide enough power for your needs and that can provide that power for long enough to be useful.

When calculating your power draw, it's worth remembering that the system itself will have peripherals necessary for use. Unless it's 'headless', you'll also need to provide power for your monitor and maybe devices like a router or modem if you're keen on protecting these devices from power interruptions as well.

Calculating the power requirements of every device is tricky (you can use an online wattage calculator to give you a rough example) but we'd recommend that you start by simply checking the wattage rating of your devices and add them together. A 500W PSU isn't going to pull 500 watts all the time, but calculating in this manner gives you an upper ceiling for your UPS requirements and ensures that you have room to continue running your system even under the most taxing conditions. Too much battery life is better than too little, after all!

If that seems like playing it too safe, you can use a smart meter or other monitoring device to check the power draw in real time and use that as your basis. Remember to account for all the peripherals you want to run – put them all on the same multiplug and then test the power draw on that – and test your PC when it's running a complex operation, like a game or HD video, so you aren't just checking the power draw at rest. This will hopefully give you a more accurate reading, which you can use to better allocate your budget.



PowerPanel

Once you know what the power draw of your system is, you have to calculate the volt-ampere load, since this is the unit most UPS devices quote their capacity in. Multiply the combined wattage value of your system and its peripherals by 1.6 and you'll get the minimum volt-ampere value your UPS needs to supply. For example, a 400W system would therefore need a UPS capable of outputting at least 640VA.

As well as identifying the device class and VA output, you'll need to determine the type of technology the UPS uses. There are three types, and knowing which you're looking at will help you account for some potentially large differences in the pricing of otherwise similar-looking UPS models.

The cheapest versions are known as 'offline' or 'standby' UPS devices. If you try to buy a UPS and it doesn't claim to be anything other kind, that's because it's this – the most basic type.

Offline UPS units simply charge their batteries and then switch to them if the power supply is interrupted. The switch takes only a few seconds, which is easily within the tolerance boundaries of most electronics, so there should be no ill effects from the miniscule interruption it causes.

Line-interactive UPS units work in much the same way, but include a transformer that can regulate power during brown-outs and sags, so the power doesn't have to go off completely for the UPS to make itself useful – any drop in power is compensated for. Line-interactive units are slightly more expensive than offline models, but not especially so.

Online UPS units are the most expensive and require a significant amount of extra technology inside them. Unlike the other types, an online unit completely isolates any devices it runs from the mains supply and handles the flow of power at all times. Any device plugged into it effectively runs off the battery, and the battery itself is constantly recharged while mains power is available. This is particularly good if you have very sensitive hardware to run, as any loss in mains power is not accompanied by any interruption, but it does come at a significant price premium of anywhere from 200 to 400 percent.

For obvious reasons, we recommend that home users restrict themselves to an offline or line-interactive unit depending on their personal needs, but unless you know you need an online unit, you shouldn't for a home PC.

“Fans of noiseless computing will want to check whether their UPS has a fan inside as well”

UPS Efficiency

Calculating how long a UPS will run your system before once the power goes off isn't an easy job, which is why manufacturers often give the estimated run time for a half-load (i.e. drawing 50% of the available wattage). Unfortunately, that's not particularly useful in real terms, and that's above the usual embellishments manufacturers stack on top of their devices. For a start, a half-load isn't actually the mid-point of the maximum time a UPS can power a device for. A full load runs for about 40% of the time a half-load runs for, so if a device with 600W output runs at 300W for six minutes, it'll run at 600W for about 2.4 minutes.

Unfortunately, calculating the performance of a UPS yourself is quite difficult. You need several pieces of information to get started: the voltage-ampere rating of the UPS device, the number of battery cells it houses, the DV voltage rating of the batteries, the device's efficiency and the capacity of the batteries in ampere-hours. A lot of this information is only available in the manual and not in online spec sheets, so you may have to do a bit of digging to find it.

Once you do have that information, though, you simply multiply the battery voltage by the AH rating by the efficiency, then divide the result by the VA rating. This should give you a relatively small number, which is the estimated power delivery time in ampere-hours. You can then multiply that number by 60 to get the result in minutes, and then that value by the

ON SALE NOW

Order your print or digital MagBook at **magbooks.com**

number of cells to tell you how long it can run in total.

Although it's a useful exercise in understanding how UPS power requirements are calculated, it's often not very practical to actually perform this calculation for every device you want to buy. Rather, we suggest trying to find reviews of any UPS you want to buy and relying on their assessments.

Other Features

If type and output don't help you pick a UPS, you'll want to consider what other features the unit offers. We've already touched on a few things UPS devices can do that makes them more than a simple battery-backup, but let's look at them in detail.

First of all, you'll want to consider the software compatibility of the unit. Most modern UPS devices have a feedback ability that allows you to monitor the efficiency and usage statistics over a USB connection. This can also be used to provide a notification to the PC itself to the point of performing an automatic safe shutdown if the battery levels get too low. When you buy a UPS, you should look for this feature and check that it's compatible with your OS, particularly if you're running Linux or Mac OS X.

"When calculating your power draw, it's worth remembering that the system itself will have peripherals necessary for use"

If you don't want to use a feedback connection and software control panel (or can't, because you have a non-standard OS, for example), then you might want to go for a UPS that has an on-board LCD display. While most devices have rudimentary indicators in the form of LEDs or beep codes, the more advanced information available in a software control panel is usually replicated on an LCD display where available.

It's also worth checking the number of sockets the UPS offers. Some have only one or two sockets, some have eight or more, but it's important to note that not every socket will necessarily be connected to the battery backup. Some UPS units give you off-battery sockets that won't be powered if the mains supply is disconnected, but they may still have surge protection features. Likewise, many offer surge-protected and filtered telephony and network points for your modem or Ethernet connections.

Fans of noiseless computing will want to check whether their UPS has a fan inside as well. Large units usually contain one, but smaller ones don't. If you go for a unit class that requires a fan, then the same rules as ever apply: larger fans are quieter because they run slower.

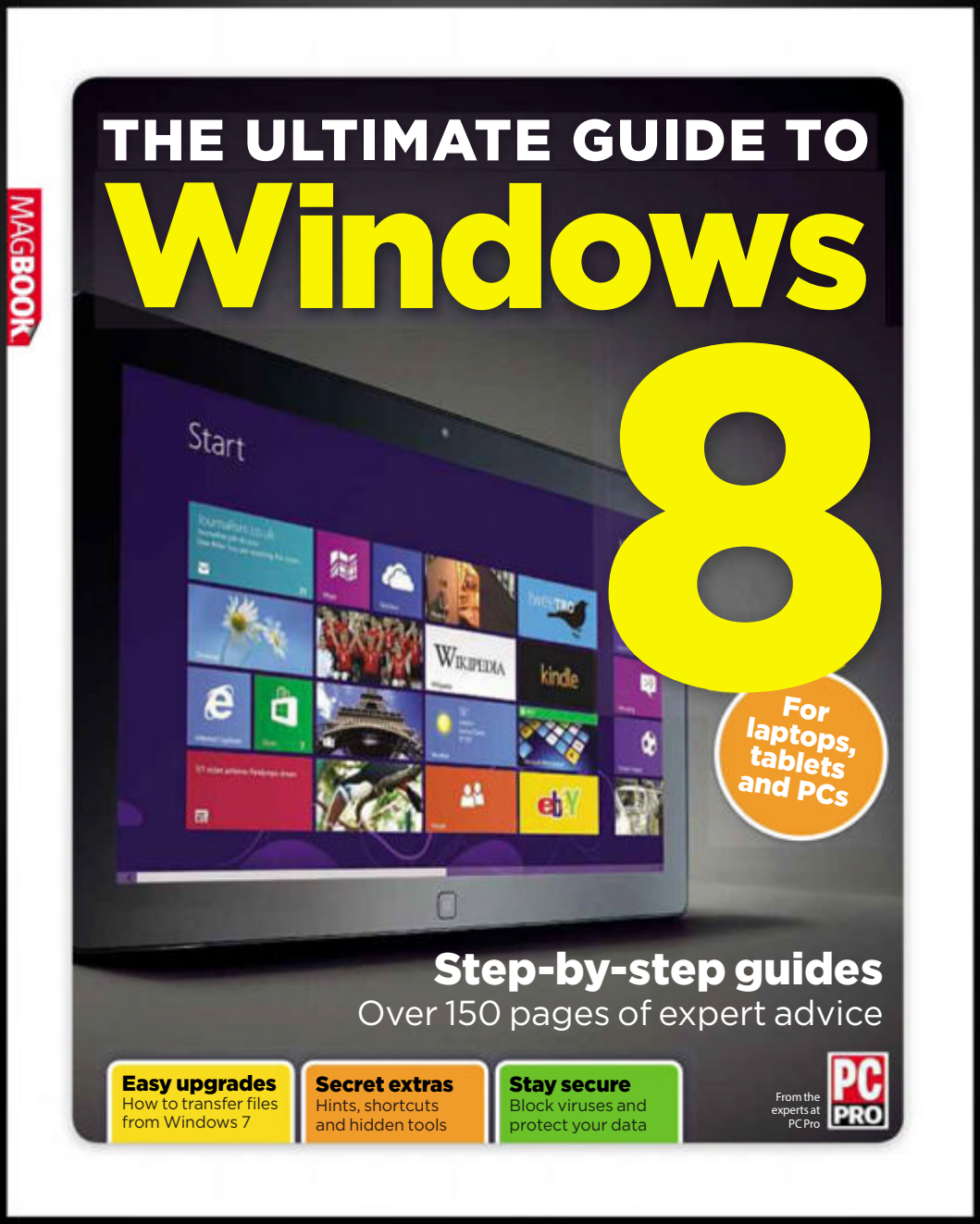
Finally, it may not be an immediate concern, but you should check whether the batteries are replaceable. Although they're based on slightly more sophisticated technology than a laptop battery, UPS batteries still deteriorate over time, and most have a useful lifespan of about three to five years. Swappable batteries can be replaced by the user, but sealed units will have to be replaced entirely. Don't expect cheap units to have swappable batteries, though – the price of the battery itself is usually between £50 to £100, so it wouldn't be economical for the cheapest devices to support replacements!

And that concludes this guide. Hopefully you now know what a UPS is and how to go about buying one. All you need to do is decide how much use it would be for you! **mm**

CyberPower Value 600EILCD

Everything you'll ever need to know about **Windows 8**

MAGBOOK



ON SALE NOW

Order your print or digital copy direct from **magbooks.com** or call on **0844 844 0053**

Magbooks cover a range of topics from IT, Motoring to Fitness and Lifestyle

ONLY £7.99

Next Gen Games Designers

David Hayward chats to a local university that's offering a degree in computer games design

Computer gaming is a fascinating industry, when you stop to think about it. Here is an industry that has boomed in the last 30 years, from lone individuals, toying with routines to make coloured blob move across screens in as pleasing a way as possible, to teams of talented artists, musicians, coders and countless others, working to a tight schedule with budgets rivalling that of Hollywood movies.

Now, with the advent of mobile platforms and app stores, solitary coders are once again finding success, alongside the huge, multinational development houses. But in spite of an increase in the number of employment opportunities, the rise in value of the games industry has made it an extremely competitive field to move into. If creating games is your passion, then you're going to need more than a portfolio of clever routines.

Getting in at the ground level of a games development firm is one such way, but it's often one that can take considerable time for you to prove your worth, and you might not learn the kind of skills you were hoping to. Thankfully, there's another way, which that will greatly enhance your chances of being employed by a games developer: through a university.

A Higher Degree Of Success

Degree programmes have advanced somewhat since most of us were at uni. These days, students, regardless of their age and background, have a vast selection of courses to choose from, be that football, sign language, bio-engineering or neuroscience.

The computing degrees have changed too. No longer are you limited to just the traditional subject of computer science, because now universities cover pretty much every aspect of everyday business computing. Included among these is a relatively new programme of study, computer games design.

The Staff

Rob Kurta
Course Leader

Rob qualified with a PGCE in 1992 and an MA in Sociology and Cultural Studies in 1997. He is course leader for the Computer Games Design degree. Currently Rob is the external examiner for the BA in Computer Games Art at Anglia Ruskin University. Rob's specialist teaching area is in non-digital game design, where students are engaged in the fast iteration and development of core game mechanics. In addition to his teaching brief, Rob is a director of Waterfront Games. This company specialises in producing game related product for the leisure and heritage sector and employs post graduates from the BA Games Design course, helping students to bridge the gap between graduation and full-time employment within the industry.

There are a number of institutes now offering a degree in games design, with some appearing to have more focused content than others. One university delivering particularly high calibre course content is University Campus Suffolk (UCS) in Ipswich.

UCS is a partnership of regional colleges and two validating universities. The validating universities, the University of East Anglia and the University of Essex, work with Lowestoft College, Great Yarmouth College, Otley College, Suffolk New College and West Suffolk College to offer students an eclectic mix of courses, all within easy reach of their location throughout the whole of East Anglia and with the partnership of local businesses.

The main campus is located in the Waterfront Building in Ipswich since its opening in 2008. This is a modern construction with ample facilities, surrounded by a collection of modernised legacy buildings, where specialised courses and subjects are taught.

The attraction of UCS, though, isn't so much in the buildings or facilities, but rather in the combined skills of its teaching and support staff. In the case of UCS's games design degree, there's a wealth of knowledge in the academic staff, many of whom have previously worked in the industry, for companies such as Ubisoft and Eidos.

We recently spoke to Rob Kurta, the senior lecturer and course leader, about the games design degree at UCS and asked him what makes this course differ from others and more traditional computing programming degrees.

Designing The Future Of Gaming

Rob and his team have spent considerable time in designing the right degree for modern students, a feat that's not quite so easy in an industry that's as dynamic as gaming.

The UCS Waterfront Building is a great modern construction in the heart of Ipswich

Clean lines and a spacious interior make it a welcome place to learn and achieve

As a three-year, full time course, a lot can happen in the games industry in that time. A new platform could be made available and become popular – take VR for example. Different ways of gaming could emerge, with the more traditional 'install on your PC and play' format going the way of the dodo in favour of something more cloud based and cross platform. In a world where changes are so often thrown into the mix in such short timescales, finding the right balance of modules and content so the student can come out the other side with a piece of paper that's actually worth something is a mammoth task.

However, as Rob explains, it's not so much about being able to create a triple-A title, as it about enabling students to have the practical expertise to fit into the development cycle of a game. Indeed, although making a game is at the core of the course, the students must be able to engage with each individual component of a game's production.

While a student may excel at 3D graphic design, they may not be so great at scripting and vice versa. Also, while a student may not be the greatest at manipulating an industry-specified games engine, their project management skills might be the glue that holds all the skill sets together.

Each student therefore will take part in all aspects of game creation, through the 'full production pipeline', as Rob mentions. From the minute the student enrols on the course, they are guided through the process of creating a game; from the group design and idea sharing, to the initial pitch and feedback stages from their lecturers and on to setting up a workflow, accounting for time taken on a particular element and finally being able to produce the work needed to fulfil each segment of the game.

The students will be placed into groups, with each individual over the course of the year performing one of the elements that make up the game. This way, everyone can experience what's needed for 3D modelling, art production, scripting, level design, game mechanics, testing and, of course, the overall project management.

Beyond the nuts and bolts construction of a game, the course content includes an understanding of the concepts of making a game, the genres and how gaming has evolved

"In a world where having the competitive edge means even getting someone from the industry to look at your application, every little helps"

The Staff

Eddie Duggan

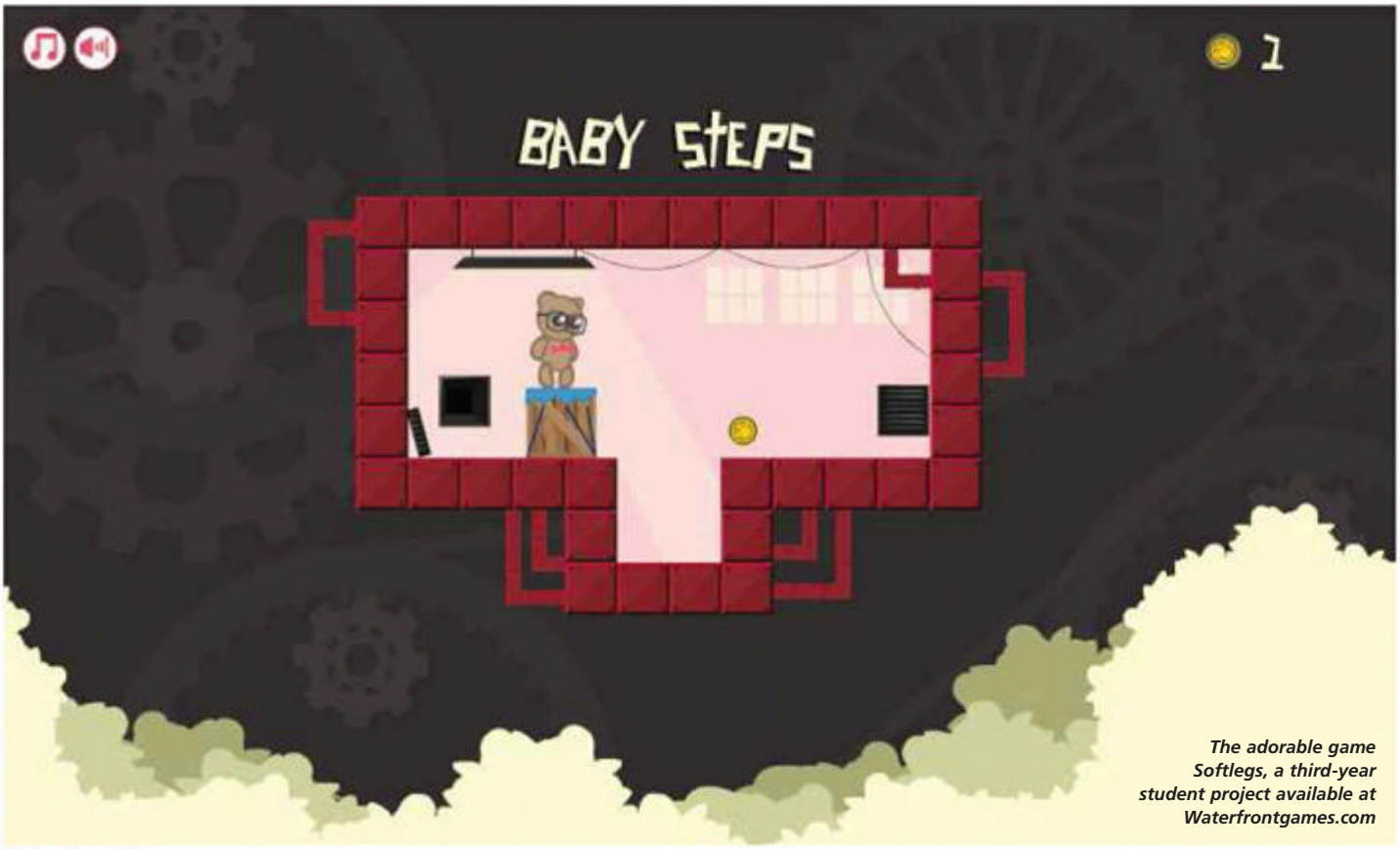
Senior Lecturer

Eddie Duggan holds a BA (Hons) in Humanities from The Polytechnic, Wolverhampton, an MA (Alt) in The Word and The Visual Imagination from St David's University College, Lampeter and a PGCE(A) from The University of Surrey. Eddie's current research interests are in ancient games. He presented a paper entitled "Strange Games: Some Iron Age Examples of a four-player board game?" at the XVII Annual Colloquium of the International Board Game Studies Association, hosted at UCS in May 2014.

Chris Janes

Lecturer and Technician

Chris holds an MSc in Advanced Games Computing. Between providing support for students and staff, Chris spends what time is left working on various personal projects, the grandest of which is *Hidden: Source*, a modification of *Half-Life 2* that saw Chris and his team flying out to San José in 2006 to attend the annual Games Developers Conference as part of the Independent Games Festival.



The adorable game Softlegs, a third-year student project available at Waterfrontgames.com

over the years, as well as the hardware in which it has evolved on. Rob himself uses more traditional, non-digital, board games to better teach the concept of gaming. Using turn-based, dice-rolling games to establish the core mechanics of a game, Rob can physically display how a player interacts with the game: where their focus is driven to, what aesthetics make the game playable and ultimately addictive, and how a win is achieved through a reward structure.

It's certainly an intriguing concept.

As Rob states, "this makes for a more rounded student and one who can grasp the core of a game and apply it in a digital format."

The use of traditional board games also illustrates another key point with this particular degree programme, in that computer gamers aren't necessarily the only applicants for the course. Obviously you'll need to have a passion for wanting to be a part of the game creation process or to create one yourself. But where a modern gamer may only have a limited vision when it comes to being a player, someone with more traditional analytical gaming skills could easily find themselves a better team member.

Hardware Used

The course is currently primarily housed in one of the buildings off the main Waterfront Building, with the hardware located in two rooms, each with 25 (and counting) Fujitsu Celsius M730 workstations.

Each M730 has an Intel Xeon E5-1620v2 3.7GHz processor, with an impressive 10MB L2 cache, 8GB of DDR3 memory and a 2TB hard drive. There's an Nvidia Quadro K6000 graphics card present, which drives a dual-monitor setup on each machine, with the option to add another screen, should the students require it.

The Games Design course computers are set up on their own network, with access to the main UCS resources, which allows the students full, unrestricted access to each PC, so they can freely download and install any software and access any sites relevant to the course. In addition, the PCs are maintained by the technical team, who can apply a fresh image when needed.

The Fujitsu M730 is a good choice of hardware, as it's fairly well priced and can deliver considerable performance when required. They're reasonably also quiet even when being pushed to the limit – something that a more traditional PC can struggle with.

This is quite an important feature when you're dealing with a lab of 20-odd machines in fairly close proximity. The combined noise and heat generated when two dozen PCs are pushed to the max with 3D rendering is quite a thing to behold – but probably not when you're a student trying to get your designs complete in time.

The M730s, however, provide powerful yet quiet workstations, without the added heat that a bedroom gaming PC will inevitably generate in similar circumstances.

The Staff

Dave Pimm

Lecturer

On completing his Masters degree in Digital Entertainment Systems at the NCCA, Dave entered the computer games industry as an artist. He remained in the industry for 12 years, straddling both design and art disciplines, moving into the role of creative director for a well-established indie company. Dave is particularly interested in digital storytelling and is actively engaged in the exploration of procedurally generated narratives and metanarratives.

ON SALE NOW

Order your print or digital MagBook
at **magbooks.com**

Software Used

The hardware is more than enough when it comes to creating Flash-based content and games, but there's a lot more used on this course than you would first imagine.

As we've already said, the students will gain experience and use a variety of tools to produce their games on. These include things like Unity, Unreal and other game engines, as well as Adobe Photoshop, Premiere Pro, 3D Studio and Autodesk's Maya 3D Animation software. There's also an element of scripting in use, through Flash, Unity and so on, and although not specified as such, there's no reason why a student couldn't inject their own custom programming with C#, Java, HTML5 or similar.

These exist on a traditional Windows 7 build but with the ability to use virtual machines to emulate other systems on which to test their end animations and routines. Needless to say, the technical requirements are well met with the choice of hardware used.

Finally, the project management elements are handled with Atlassian's JIRA, a project tracking program. This allows the students to keep track of each aspect of the project in hand and create to-do lists, along with trigger events to prompt the manager when timescales and deadlines are rapidly approaching. Also, JIRA allows communication with each member of the team as well as the lecturers, and a full document update relating to the individual tasks.

Each installation is not locked down and can be used to its maximum potential, freeing up the students to explore the unique elements that make up this industry-specific software collection. At the end of the three years, the students will have had considerable experience in using each package, which on its own is an impressive addition to any CV.

Industry Partnership

Learning in a class environment is one thing, but the working world can be a completely different beast altogether.

To help the students gain experience outside of the classroom, the UCS Games Design team have partnered with the local, Ipswich-based games developer Ludologic, which provides a sponsored games programming module.

Students will benefit from regular contact with the industry partners, both at UCS and at Ludologic's studios in the centre of Ipswich. This helps build up relations between the industry and the student and naturally allows each individual to experience the kind of workloads and demands that will be placed on them when they graduate and secure their dream job in a games design and development studio.

To add to that, the Games Design team also run a commercial games company called Waterfront Games, which can be found at **www.waterfrontgames.com**.

Lecturer Dave Pimm takes his students through level design

The Staff

Dan Mayers

Lecturer

Dan holds a BA (Hons) in English from the University of Plymouth and a postgraduate diploma in Publishing, also from Plymouth. His background is in games-related writing and games design, with 13 years' experience in publishing and development. Dan has served as Acquisitions Manager at Eidos Interactive, where he was involved with quality evaluation of projects including *Tomb Raider*, *Hitman*, *Championship Manager* and *Deus Ex*. As a producer at Eidos, Dan managed projects and budgets and teams and has worked on *The Italian Job* (2003), *Crash 'n' Burn* (2004), *Just Cause* (2006) and the pre-production phase of *Just Cause 2* (2009).

Waterfront Games is a portal for showcasing the students' portfolios, which also offers a year-long paid internship to a selection of students to further boost their skills and experiences, as well as giving them something to put on their CVs.

The experiences the students get don't just involve the creation of the latest first-person shooter, but rather a more realistic design approach using the latest platforms to deliver content for real-world situations. For example, UCS students are developing a game for a local museum, where children can learn about the exhibits through an interactive experience.

Graduate Employability

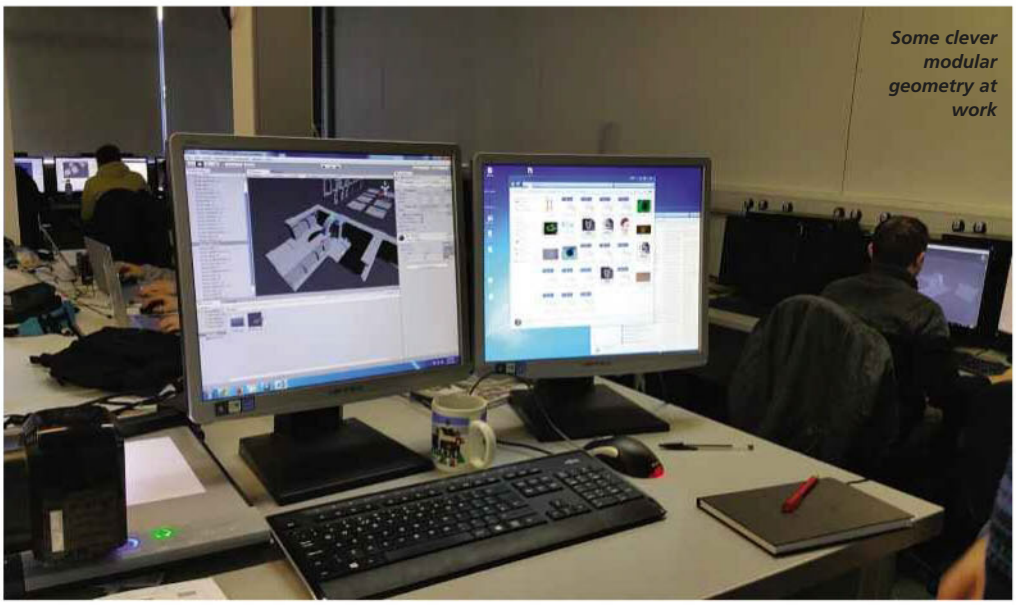
While there's no way UCS can absolutely guarantee that a student will be employed after completion of the Games Design degree, their chances are very favourable.

The mix of course content, together with the experiences gained in the software and the working portfolio, mean that a UCS games design student has a better chance than most when it comes to seeking work within the games industry. As a matter of fact, a pair of recent graduates, Chris Fillip and Maria Barte are now employed by Ubisoft Studios in Bucharest, as a junior designer and in the Q&A team respectively.

There are also a number of other examples of UCS graduates gaining employment in their chosen field in the games and media industry, in junior roles or as designers, testers and other occupations.

In a world where having the competitive edge means even getting someone from the industry to look at your application, every little helps.

One side of the Games Design lab, with a selection of dual-monitor Fujitsu's available for the students to work on



Some clever modular geometry at work

And graduating with a BA (Hons) in Computer Games Design from UCS will certainly make for a more interesting read for the employer.

Standing Out From The Crowd

While you may envisage a group of games design students huddled over a steaming computer, feverishly entering line after line of code, the reality is far different.

We found the course to be relaxed, focused and expertly delivered. The emphasis on designing a game throughout its entire duration is commendable and allows a broader range of skills to be applied over time for each individual student.

It's also the understanding of the industry that the students will ultimately be going into what they especially liked. And while a student may be more focused at the end of three years on a particular aspect of the development of the game, they can effectively apply their knowledge and experience to each level of the design process equally. The result is a better and, more importantly, employable applicant.

There are cutting-edge technologies and techniques in use here, and with an eye to the future of emerging technology, the course and its lecturers have managed to create a syllabus that's industry specific and innovative in its delivery.

Conclusion

As you would expect, there's a lot more to the course than what we've briefly mentioned here. One element we can't project in print is the enthusiasm and passion the team have for delivering their course; it's really quite infectious and very inspirational.

If you're looking to start a degree course and it's game design you're interested in, then we can't recommend the Computer Games Design at UCS enough. Even if you're returning to education and other responsibilities mean you can't make a full-time course, UCS also offer this programme part time.

Either way, if you want more information, then take a moment to look up the UCS Games Design information page at **goo.gl/LbTo8T**. There you'll find all the relative links for applying, as well as information on UCS and the surrounding area. **mm**

Contents And Modules

To help produce the next generation of skilled games designers and developers, the Games Design team have put together a range of modules to create the designers of tomorrow.

As per the UCS site, the modules for each year are as follows:

First Year Modules

- Group Project
- Introduction to Design Methods
- 3D Modelling for Games
- Introduction to Digital Production Techniques: Scripting
- Introduction to Critical Games Studies

Second Year Modules

- Modding
- Practical Prototyping
- Managing Games Production
- 3D Modelling for Games
- Digital Scripting
- 'Anymation'

Third Year Modules

- Dissertation
- Game Project
- Portfolio
- Design Masterclass

Component Watch

Component Watch

Here are some laptop bargains that are real tablet-beaters

Last week we looked at the cheapest tablets you can buy right now, but not everyone finds tablets useful. What if you want a better keyboard, or a real screen, or USB ports you can actually use? Obviously, you need a laptop. But can low-end laptops compete with tablets on price? We've picked out five to prove that it's possible to spend less on a laptop than a tablet and still come out with something worth using.

Deal 1: Lenovo Essential B50-45
RRP: £210 / Deal Price: £160

Even the cheapest laptop on the market is still more powerful than the average tablet you'll come across. What's more, it features a comparatively huge 15.6" screen, as well as a 320GB hard drive – both well in excess of what even the best tablets can offer. In addition, you get 4GB of RAM and an AMD E1-6010 CPU, as well as a whole host of extras including HDMI support, Windows 81 and a DVD writer. Basically, if you need to get a bit of work done, but all that involves is basic wordprocessing, email and a bit of web-based research, then this has definite advantages over a tablet.
Where to get it: Ebuyer (**bit.ly/1yvR2JQ**

Deal 2: HP 255 G3
RRP: £226 / Deal Price: £200

Aimed at business users, the HP 255 has a 15.6" 1366 x 768 display, 4GB of RAM, 500GB hard drive and also offers a HD webcam built-in, which would be ideal for skype/video conferencing. Although the processor is an AMD, it's not like this is a machine built for gaming – though the A4-5000 APU includes Radeon HD 8330 graphics, which will offer decent all-round performance and handle non-intensive tasks. Basically, the 20% discount makes it a great deal for anyone whose needs are met by these specifications.
Where to get it: Ebuyer (**bit.ly/1tgdYzq**

Deal 3: Asus X102BA-DF049H
RRP: £300 / Deal Price: £205

The surprisingly powerful Asus X102BA contains an AMD A4 1200U with 4GB of DDR3 RAM and a 500GB drive. Its low price belies its status as a desktop replacement for non-gamers, and the only issue is is the small 10.1" screen – which is nonetheless bigger than any tablet at this price. Either way, it's a bargain for £205 (even if the cheapest version has a metallic pink case).
Where to get it: Debenhams Plus (**bit.ly/1aenvPF**

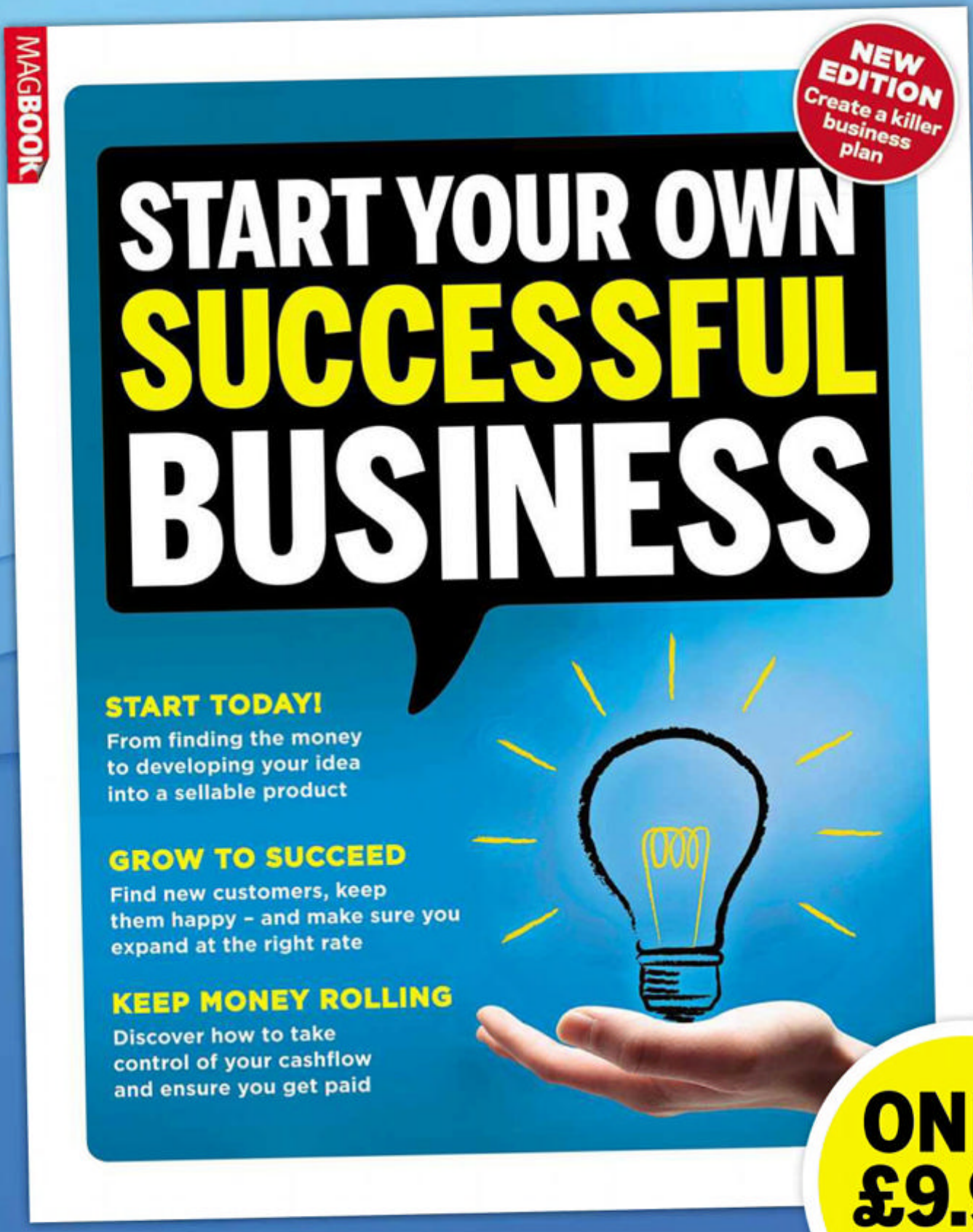
Deal 4: Acer Aspire V5-123
RRP: £300 / Deal Price: £251

The Acer Aspire V5 series has been slimmed down for convenience, and this 11.6" model is nice and compact – though you are paying for its high-quality LED screen. Internals include an AMD E1-2100 CPU, 2GB of DDR3 RAM and a 320GB mechanical hard drive. If compact form and sharp visuals are your thing, this is the one to go for.
Where to get it: CCL (**bit.ly/1I0nAUJ**

Deal 5: Toshiba Satellite Pro R50-B-122
RRP: £400 / Deal Price: £320

If you want an Intel Core system it's worth spending some money, but this Toshiba Satellite Pro contains a Core i3-4005U that's just old enough to snag a fairly significant discount without negatively impacting performance. A 15.6" screen, 8GB RAM, 1TB hard drive and Windows 8.1 finish off the package. Vastly more powerful than any tablet you'll find at this price.
Where to get it: Dabs (**bit.ly/1lMm85Z**)

ON SALE NOW



Order your print or digital MagBook at **magbooks.com**

Laptop Goes Boom

Portable speaker brings the noise

Speaker systems specialist Edifier has released its latest portable audio effort, the MP211. This newest entry into the field offers a portable speaker in a bunch of colours plus an easy-to-navigate solution between the SD card input and Bluetooth 4.0 input. The MP211 also lets you change tracks and adjust the audio output. Bluetooth connectivity means that you have the required wireless audio playback, while it can also be paired with a smartphone for both audio and answering or switching a phone conversation.

Lightweight, compact, and rechargeable via the included microUSB cable, the MP211 can be yours for £40. You can, of course, find out more at **www.edifier-international.com**.

Easter Bytes!

Festival still on... but you'd better be quick

Minecraft Giveaway

Game handed to secondary schools in Northern Ireland

The über-popular block-building sandbox that is *Minecraft* is going to be delivered to every secondary school around Northern Ireland, we're told.

The deal has been put together thanks to a "ground-breaking" project from the CultureTECH innovation festival and the scale of it is rather impressive. Some 200 schools and 30 libraries and community organisations will benefit from the initiative which will hand over download codes for the educational faction of the title, MinecraftEdu. In terms of children, that equates to around 50,000 children reached by the initiative annually.

What with this and the announcement of the BBC's Micro Bit, today's schoolkids could be going through something of an exciting time when it comes to linking education with technology. Best days of your life indeed!

QUICK BITS... **Apple news blog 9to5mac has reported that Apple Watch Edition buyers will be given a high-end, personal service**

Our friends at The National Museum of Computing are running its Easter Bytes Festival, promising "digital fun and games for all the family".

Running until April 12th, there's just enough time to pop in if you haven't already and there certainly sounds to be a lot going on. Supported by Bloomberg, the festival is themed around robotics (past and present) and away from seeing various robotic bits and pieces, hands-on activities include exploring the Colossus computer, taking a closer look at the Oculus Rift VR headset and the new BBC Micro Bit, a computer music workshop and *Minecraft*-centric fun.

TNMOC is typically pretty good at this kind of thing, so it's likely to be worth a look if you're in the area. However, if you want to look at its plans in more details, vistit **www.tnmoc.org/bytes** before you head off.

Call Of Duty Champions Crowned

Denial named 2015 winners

The annual *Call Of Duty* world championship has been and gone and American team Denial eSports came out the big winners. Fighting its way to the final, Denial then met the scary-sounding Team Revenge in the big match-up. The prize fund for this year's 32-team competition was a cool $1m, with Denial bagging $400,000 for coming out on top so, while we congratulate Denial eSports on its success, don't judge us for wondering whether the world has gone just a little bit strange at offering this sort of money for playing video games.

Or perhaps we're just jealous that they don't do any *Match Day II* e-sports competitions. We were great at *Match Day II* back in the day. Oh yes.

when buying the $17,000 watch

Ever since Netflix launched in the UK, I've had a membership. To me, it's a bargain to have access to a pretty decent amount of content (and a great amount if you get around the region restrictions). I also pay for a premium Spotify account, have Amazon Prime Instant Video, and I've paid for numerous apps and games over the last year or so.

I'd like to say the only reason I've handed over money for these things is to support their creators, but that wouldn't tell the whole story. Yes, I do think it's important to pay for things, so more of the things you like can be made, but probably the factor that spurred me on the most was cost. These things all seemed reasonably priced for what they offered.

I've never been the kind of person to spend £15 on a DVD or Blu-ray, no matter how much the movie studios might want me to. But give me an affordable streaming solution, and I'll definitely be up for it.

With the right legal services, who needs BitTorrent?

See you next time…

Anthony

Editor

Meanwhile... On The Internet...

Google's (let's call it) 'interesting' relationship with China took another turn last week, when a blog post (**tinyurl.com/MotI1357a**) revealed that it would no longer be accepting security certificates issued by the China Internet Network Information Center (CNNIC), the nation's biggest web registrar. The decision was apparently the result of some CNNIC certificated sites, approved by a sub-contractor called MCS operating out of Cairo, proving to be vulnerable to man-in-the-middle attacks a while back (**tinyurl.com/MotI1357c**), and effectively locks CNNIC out of the SSL protocols going forward (**tinyurl.com/MotI1357d**). Indeed, after an investigation into the matter, Google concluded that CNNIC, in allowing MCS to issue licences on its behalf, has "delegated their substantial authority to an organisation that was not fit to hold it".

What this means in practical terms is that if users of Google Chrome attempt to visit a HTTPS site with a CNNIC certificate, they will receive a warning that the site is 'unsecure' and asked if they wish to proceed. However, Google has offered certain key CNNIC clients a grace period in order to seek alternative certification from another vendor.

For its part, CNNIC appears to refute the accusations that it was lax in issuing its certificates (**tinyurl.com/MotI1357e**) and has described Google's decision as "unacceptable and unintelligible" (**tinyurl.com/MotI1357f**).

Last week, we looked at the Indiegogo campaign for the Broken Lizard comedy team's new movie, *Super Troopers 2*, and how it had blasted through its $2m target in just over a day. We picked it out as just the latest in a line of such projects that were helping to establish crowdfunding as a viable way of getting a movie made and how it was part of a changing entertainment ecosystem (**tinyurl.com/MotI1357m**). Well, as if to prove what a big business the crowdfunded market is, *Wired* this week interviewed the marketing mastermind behind the *Super Troopers* campaign (and some other massive crowdfunding successes), Ivan Askwith (**tinyurl.com/MotI1357h**).

In a fascinating interview, Askwith pretty much breaks down the anatomy of a successful campaign, in what we're pretty sure will amount to something akin to a masterclass for Kickstarter-centric businesses (he was also involved in the hugely successful *Veronica Mars* funding campaign, as well as helping out with the phenomenon that is Exploding Kittens: **tinyurl.com/MotI1357n**). He outlines exactly how fundraising efforts like Broken Lizard's look to engage their audience, and ensure that they get the maximum value from every person they convince to contribute. So good is it, in fact, it makes you wonder what techniques he has up his sleeve if he's willing to give this much away.

If ever you want to know that something has reached maturity as a concept, it's usually when it has a 'guru', and Askwith may well be exactly that in the crowdfunding sphere.

Every year, the Vancouver-based Pwn2Own hacking competition serves two purposes: making our software a little bit safer by exposing its flaws and acting as a sobering reminder of just how vulnerable some of it is (**tinyurl.com/MotI1357i**). This year's event saw firms dole out a whopping $442,000 for 21 critical bugs unearthed across the four major browsers, Windows and Adobe's Flash and Reader (**tinyurl.com/MotI1357j**).

One participant, working under the handle 'lokihardt', even managed to bring down Google Chrome, which has become the de facto Moby Dick of the event over the last few years. He pocketed the biggest single cheque of the whole affair for his trouble – a whopping $110,000 for using the exploits he'd developed to gain full system access and managing to work around both the stable and beta versions. Apparently, his whole demo took just two minutes, meaning he earned over $900 per second! The same guy then went on to hack Internet Explorer 11, Windows and Safari, to leave the event nigh-on a quarter of a million dollars richer than he was when he checked in.

While 'lokihardt' payout was the biggest ever awarded to an individual, it was nothing compared to the $400,000 earned last year (**tinyurl.com/MotI1357l**) by French exploit research team Vupen – which caused a stir in 2012 for refusing to reveal its exploits (**tinyurl.com/MotI1357k**) and didn't take part under the new rules bought in this year. It does, however, prove that the murky world of hacking can be a very lucrative business, even for the so-called 'white hats'.

.AVWhy? Videos For Your Eyes... Not Necessarily For Your Brain

Unless you're a bit of an animation geek, you may not know the name Glen Keane. He was, however, one of the key figures behind the look and feel of Disney's so-called 'Second Golden Age' during the 90s (**tinyurl.com/MotI1357p**) and a giant in the field. More recently, after retiring from Disney, he has been making a short film called *Duet* in conjunction with Google's ATAP (Advanced Technology and Projects) division (**tinyurl.com/MotI1357q**), and has recently spoken to *The Verge* about his work with the two media giants (**tinyurl.com/MotI1357r**).

While it may be slightly disheartening to think that the whole Gamergate horror-show may have blunted Anita Sarkeesian's drive to cut through the jungle of gender stereotypes that pervade the videogaming ouevre, it's understandable that she may wish to avert the focus of her intellect a little bit. Thus, in a new series of *Tropes vs. Women In Video Games* (**tinyurl.com/MotI1357o**) she is putting a more positive spin on her analysis of the genre by picking out positive female role models and highlighting the games that use them. The first episode features The Scythian from *Sword & Sworcery* (**www.swordandsworcery.com**) and is well worth a look.

Caption Competition

She's got a blank space, baby... And here are the best suggestions you came up with for a caption to this picture.

- **JayCeeDee:** "I was trying to read your mind, but you need to think of something!!!"
- **EdP:** "My job is so secret this is all I can show you - just call me Lady in Grey!"
- **Shuggie:** "The Official MEP name badges..."
- **Thomas Turnbull:** "I used my credit card online and they wiped me clean."
- **Thomas Turnbull:** "They said my credit card had been refused but it was all white on the night."
- **EdP:** "You will never guess just how much spyware I can cram on this!"
- **HTST:** "Ooops, I forgot what I was going to display on the psychic paper"
- **Pesukarhu:** "The new iCard - Giving you aesthetics over functionality!"
- **Big Daddy:** "Doctor, Who?"
- **EdP:** "Only those with a high IQ can see my job title."
- **Nadine.Wood:** "New idea for ink saving, don't use it!"
- **Phantom9:** "It's the new Apple iPhone 7! As thin as a business card and no bigger than a business card..."
- **EdP:** "You asked for a blank card in designing this system - here it is!"

Thanks to you all, and congratulations to our winner, Thomas Turnbull, with "I used my credit card online and they wiped me clean."

To enter this week, head to the 'Other Stuff' section of our forum (**forum.micromart.co.uk**) and say something funny (but not too rude) about the picture below or email us via **caption@micromart.co.uk**.

Tim Cook Will Donate Fortune To Charity

Apple boss makes announcement

Apple's Tim Cook is reported to have expressed an intention to leave most of his vast wealth to charity. That's quite a substantial amount, as it happens; Cook is said to be worth over $800m, although it's worth noting that nothing is going to be handed over until he's paid for his young nephew's college education when it's time to do so. He made the comments to America's *Fortune* magazine and we have nothing further to say on the subject other than good on him.

National Videogame Arcade Now Open

Best. News. Ever!

Nottingham is perhaps best known for being the home of Robin Hood – he of the tight tights and beard. Until now, that is... because from this point forward (if there's any justice) Nottingham will be best-known as the city where the National Videogame Arcade resides.

The NVA, to give it its acronym, is a celebration of the videogame industry that cost no less than £2.5m to build, and which hosts many interactive exhibits and vintage arcade players. The city, of course, is already venue of the annual Game City festival but this takes things to a whole new level. A five-level permanent space, to be exact.

There's plenty of interactivity on offer, as you'd expect, including *A History of Videogames In 100 Objects* – which is, we're informed, exactly what you'd expect it to be. Please follow the Arcade on Twitter, Facebook and tumblr and make plans to visit when you get a moment.

We know we will be.

Snippets!

Google Law Suit A Goer

A Court of Appeal has ruled against Google in a potential legal case over privacy settings. Users had claimed that Google had bypassed privacy settings on Safari and installed tracking cookies on computers to get an insight into users' browsing behaviour. While Google apparently isn't happy with the decision – having previously said that the issue hadn't led to any financial cost for anyone – it doubtless means a lot to the users themselves. Now there is a go-ahead for possible legal action.

Spotify For PS4/PS3

Spotify on PlayStation Music has now gone live, bringing the service to all PS4 and PS3 console systems. The exclusive partner of PlayStation Music, having Spotify on board is a big deal for PS4 owners in particular as they can play music in the background while playing games. The interface is pretty slick, as you'd probably expect of this kind of thing, and the Spotify Connect feature allows users to control and browse their music via an Android or iOS phone or tablet. Existing Music Unlimited users get a two-month Spotify Premium subscription for free and you can read more on this at **www.playstationmusic.com/spotify**.

Nexus Player Launches

If you have £79 to spare – and Amazon's Fire TV, the Apple TV or the Chromecast dongle have yet to pique your interest – perhaps the Nexus Player from Google is the kit for you. Powered by a 1.8GHz quad core Intel Atom, the Player is a media streamer and gamer all-in-one (with a gamepad sold separately) allowing gamers to play Android titles. Content can be synced across Android devices and the voice-enabled remote is a nice touch. However, the app-count seems slim compared to the Fire TV stick, and the £79 is more expensive than the Apple TV.

LibreOffice Online Is Coming

We just don't know when

Four years ago, news of LibreOffice Online was announced and since then interested parties waited, and waited. And waited.

So here's an update. LibreOffice is coming with a blog post confirming as much. IceWarp and Collabora have worked together on this and we are hopeful that an online version of what remains a highly impressive Office suite is indeed on its way. The blog post details how HTML5 technology is central to this latest announcement, although there is a huge caveat. This line: "the availability of LibreOffice Online will be communicated at a later stage".

Hrumph.

LibreOffice
The Document Foundation

World Leaders' Personal Data Leaked

Wow

It's been reported by *The Guardian* has that the Australian Immigration Department accidentally emailed the passport numbers and dates of birth of 31 international leaders to the organisers of the 2014 Asian Cup football tournament. Even in the grand scheme of data leaks, that's a mistake that can only be described as mightily embarrassing.

By all accounts, the mistake was because of a problem with the autofill tool in Microsoft Outlook and a decision was taken at the time by Australian authorities to keep the issue under wraps and not tell the world leaders affected.

Now that the press has caught wind of the matter, however, that decision – and the error that it attempted to cover up – will come under intense scrutiny..

Teenager Arrested For Swatting

Dangerous 'prank' caller tracked via VoIP

You may have heard of swatting, or should that be SWATting? If not, we'll explain: far from concerning dealing with annoying insects, it refers to tricking armed police into attending a scene by calling in a false report of criminal activity. The pranksters doing the calling in are the swatters, and the targets of their dangerous games are increasingly online gamers streaming their gaming prowess online on services like Twitch.

In the States, a 13-year-old teenager has been forced into confessing to three incidents of swatting, including one involving a rival *Minecraft* gamer. *Arstechnica* reported that the authorities found him out via the IP address that VOIP calls came from. Traced and hunted down, the young lad was arrested. This is a very serious, dangerous thing to do – and a growing issue out in the US and it's a pretty sad state of affairs, frankly.

QUICK BITS... **Halo 5 will exclusively launch on the Xbox One on October 27th, according to a tweet from**

Tidal Launches With Big-Name Backing

Big-name stars hope to make waves in industry

Jay-Z's music streaming service, Tidal, has been introduced to the public in a high-profile event in New York. A host of bonafide, top-dollar stars took to the stage to announce their co-ownership of the company – a service that was bought by Jay-Z earlier this year.

Apparently, what makes Tidal different to its competition – that would be Spotify and Deezer – is that this is an artist-owned service, the idea being that musicians are reimbursed for their creative works, rather than the free streaming model of Spotify leaving them out of pocket. Of course, when we're talking global, mega-rich artists like Beyonce, Jay-Z and Madonna, the idea of standing up for thise losing out on financial gains seems a rather ridiculous one.

The benefit to listeners, then, is really that Tidal offers High-Fidelity sound quality, which you have to pay £20 a month to enjoy. It also points to a possible future in which certain artists debut new works exclusively on Tidal, or choose one of the other streaming platforms available, which arguably potentially damages artists' relationships with their fanbase.

As for the launch event itself, media reports quoted artists' talk of preserving "music's importance in our lives" and changing "the course of music history". Blimey.

This. Is. Spartan!

Microsoft opens up new browser for Insiders

You may think the name is a bit silly, but Microsoft's Project Spartan is finally out of the gates with Windows Insider members getting to try it out for the first time as part of the latest Windows 10 Technical Preview build. They were told to expect a preview of the browser with a "bold new design" that was streamlined and page-focused, and – while the features in the build were in an early, incomplete state – Cortana was present (for US users only), offering up additional information while they were browsing.

The build also included 'inking' and 'sharing' for writing or typing notes directly onto a web page – potentially a genuine game-changer for some users – plus the browser features a whole new rendering engine which promises to be fast, more secure and more reliable.

If you're an Insider, get cracking – Microsoft wants your feedback as soon as possible.

Ready To Read

Kingston's all-in-one card reader

Pictured here is the fourth-generation HS4 all-in-one Media Reader from our friends over at Kingston.

This multi-function reader is better than the previous model as it now reads all major card format types, including the latest SD card speeds (UHS-I, UHS-II) and CF Type I and II. If you buy one of these, you'll be able to back up and transfer music, photos and other digital data with USB 3.0 high-speed performance of up to 5Gbit/s.

Backwards compatible with USB 2.0, the HS4 has a brushed nickel case, is backed by a two-year warranty, and you can buy one via the links from the Kingston website – which is **www.kingston.com**.

Oh, and while you're there you might wish to look up the new 64GB addition to its CompactFlash Ultimate 600x family, with speeds up to 90MB/s read and write. Lovely.

Minix NEO X8-H Plus Android

A superb Android TV device, with support for true 4K resolutions

DETAILS
- **Price: £120**
- **Manufacturer: Minix**
- **Website: goo.gl/QVutlv**
- **Required spec:4K TV/ monitor for best results, HDMI cable and remote control included**

We recently reviewed the Windows 8.1 version of the Minix NEO tiny PC and were immensely pleased with its design, performance, potential and the fact that can fit in the palm of your hand. Now it's the turn of the Android Minix NEO, but it does it have what it takes to go toe-to-toe with the windows 8.1 version?

The X8-H Plus is ever so slightly bigger than that of the previously reviewed Z64. However, despite measuring just 256 x 256 x 25mm it somehow manages to pack in a Quad core A9r4 Cortex processor with an Octo-core Mali 450 GPU, 2GB of DDR3 memory, and a 16GB eMMC flash storage – which comes pre-installed with Android (KitKat 4.4.2, to be precise).

The physical connectivity is a little different from the Z64 too, with 1.4b HDMI port, Gigabit Ethernet, three USB 2.0 ports, OTG port, SD/MMC card reader, optical S/PDIF, Dual Band 802.11a/c wi-fi, Bluetooth, and headphone and mic port. There's even an IR sensor with an Android remote control included in the package.

The design, though, is much the same its Windows counterpart. The hardware ports, power socket and button are spread along the rear of the unit and down the right-hand side. With left-hand side housing the screw connection for the wi-fi antennae. The top of the X8-H Plus has an identical debossed Minix logo, and again the entire unit feels sturdy and extremely well put together.

Once you've booted the unit and setup your Android/Google details, you'll appreciate the fact that this is unlike most other under-the-TV Android units. Where they occasionally stutter along, or feel awkward on anything other than a tablet, the NEO X8-H Plus is fluid, quick to respond and is breeze to navigate with the included remote. That's not all, though. This is primarily an Android TV box and with it comes the kind of capabilities you would normally expect to find inside a far more expensive PC with a top of the range graphics card.

The dual band a/c wi-fi offers a fast connection to a network, and means streaming high definition – and even ultra-definition – content isn't an issue. Speaking of ultra-high definition, the X8-H Plus is capable of playing H.265/ HEVC video at 2K and even full 4K. This is thanks to the combination of the Quad Core A9r4 and eight core Mali 450, which supports the new higher compression H.265 media standard. Needless to say, if you have a 4K TV or monitor, then the X8-H Plus will display your content at 4096 x 2160, and without even breaking into a sweat.

The default Minix Android desktop hosts a collection of pre-installed apps, with XBMC, YouTube, Netflix, Plex, and support for the Google TV Remote app, which will use your current Android phone or tablet as a TV remote.

Watching ultra-high video isn't the only talent the X8-H Plus has. Android gaming (utilising a handy Bluetooth controller) is exceptionally good. What's more, as with the video playback, there's no signs of lag or deterioration due to an underperforming processor.

In short, if you're in the market for an Android-based all-in-one entertainment device, then the Minix NEO X8-H Plus is the one for you. At just £120, it's an absolute bargain and will certainly show off your TV technology in its best light.

mm David Hayward

The best Android TV unit we've ever had the pleasure of testing

Samsung 850 EVO mSATA 500GB

Samsung sprinkle their 850 EVO goodness in the direction of mobile users

DETAILS
- **Price: £179**
- **Manufacturer: Samsung**
- **Website: www.samsung.com/uk**
- **Required spec: System that uses mSATA specification drives**

Laptop users are generally caught between a rock and a hard place in respect to SSD technology. They want the speed and power efficiency, but they also don't want to give up the capacity of their hard drive. Thankfully, flash memory costs are now dropping, and thus drive sizes are growing to the point where SSD technology isn't necessarily the compromise it once was.

The new Samsung 850 EVO, in this mSATA form factor, is aimed specifically at this market of people with a mobile system that they'd like to provide with a significant performance boost. They are all built around Samsung's new 3D V-NAND, and come in 120GB, 250GB, 500GB and 1TB capacities. The review model was the 500GB version, though – according to Samsung's information – all but the 120GB version delivers roughly the same performance. The smallest option has marginally lower Random Read IOPS (95k vs 97k), but most users wouldn't be able to detect the difference. There are architectural differences, that I'll mention later, but the TurboWrite technology Samsung uses smooth's out those bumps very effectively. One other small variation is that the 1TB uses the MEX controller, where all the others use the new MGX chip.

The quoted speed is 540MB/s reads and 520MB/s writes, and testing with ATTO revealed those numbers to be pretty accurate. They're also very close to the practical limits of SATA in this context, and could only be bettered with different technology.

With the performance box ticked, the next point of call is always reliability. Samsung have been bullish about V-NAND, and have extended the warranty period for 850 EVO to five years. This is where the drive capacity does have an impact, because the warranty specifies 75TB total bytes written (or 40GB per day) on the 120 and 250GB, and double that for the larger drives.

That means even the smaller drives better the reliability of the prior 840 EVO, and the larger ones are twice as good again. They also offer substantially greater power efficiency, reducing the amount of heat generated – a win-win for laptop users.

Incidentally, Samsung are offering this same product in the M.2 format, for those who have systems that take those, though only in capacities up to 500GB at this time. The EVO was always Samsung's best price and performance deal, and nothing in this version changes that.

mm Mark Pickavance

Specifications

Capacities:	120GB, 250GB, 500GB, 1TB(1,000GB)
Form Factor:	mSATA
Controller:	120/250/500GB = Samsung MGX, 1TB = Samsung MEX
NAND Memory:	Samsung 32 layer 3D V-NAND
DRAM Cache Memory:	512MB LPDDR3 (120GB-500GB models) or 1GB (1TB) LPDDR2
Performance:	Sequential Read: Max. 540 MB/s Sequential Write: Max. 520 MB/s 4KB Random Read (QD1): Max. 10,000 IOPS 4KB Random Write(QD1): Max. 40,000 IOPS 4KB Random Read(QD32): Max. 97,000 IOPS(250GB/500GB/1TB) Max. 95,000 IOPS(120GB) 4KB Random Write(QD32): Max. 88,000 IOPS
Weight:	Max. 8.5g (1TB)
Power Consumption:	Active Read/Write (Av.): Max. 3.5W(1TB)/Max. 4.3W(1TB). Idle: Max. 50mW, Device Sleep: 2mW

A solid investment for anyone with a slow mSATA-capable laptop

ASRock Z97 Extreme9

Lanes! Where we're goina we don't need Lanes!

DETAILS
- **Price: £206 (Scan)**
- **Manufacturer: ASRock**
- **Website: tinyurl.com/lfmwyp2**
- **Required spec: 5th and 4th Generation Intel Core i7/i5/i3/ Pentium/Celeron**

Not long ago, we reviewed ASRock's Z97 Pro3, a highly affordable LGA 1150 motherboard featuring the latest Intel Z97 Express chipset. As the name and price hints, ASRock Z97 Extreme9 is from the same stable, but is aimed at someone building a gaming platform.

Using the Z97 for this purpose isn't easy, because Intel, in it less-than-infinite wisdom, blessed it with only 16 PCI-E lanes; enough for one x16 slot or dual x8 configuration. You'd reasonably think that pretty much stuffs the Z97 Express for extreme multi-GPU use but, amazingly, in this design it's tried to dodge that bullet by using a PEX 8747 PCI-E Bridge. This addition inserts a switching hub into the PCI-E system, allowing for the 16 lanes of PCI-E 3.0 to be remapped to 48 'repeated' lanes.

Where most Z97 boards are restricted to a single x16 slot video card, or two cards using x8 connections, this one has five x16 slots. They're organised into 4x PCI-E 3.0 and a single PCI-E 2.0, allowing for Quad CrossFireX and SLi, should you have the cards and the PSU to drive that configuration.

This lane expansion trick only works because when system is running multiple video cards they're actually getting exactly the same data, so the PEX 8747 can take the data designed for the first x16 and repeat it to the other lanes. We mention this because it won't work with any other scenario; for example RAID controllers.

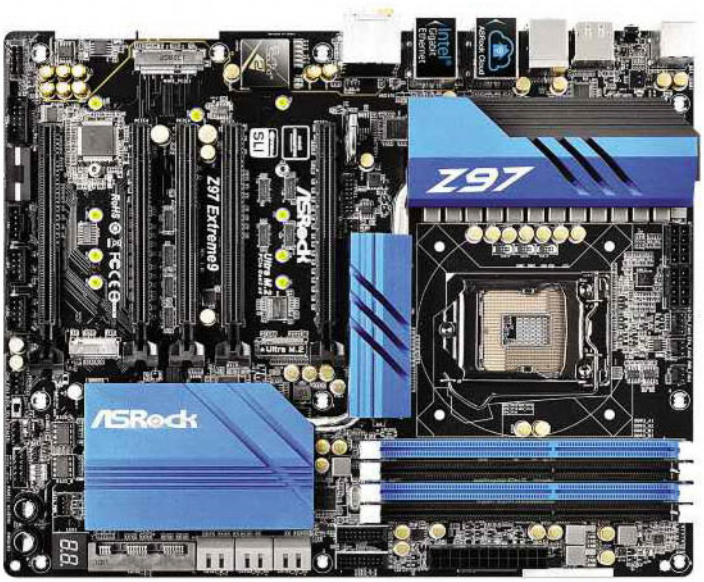
As clever as this solution is, there is unfortunately a side effect, to do with the Extreme9's other headline a feature, M.2 slots. It has two – one being an M.2_SSD (SATA) and other being Ultra M.2 (x4 PCIe) – but if you use that latter feature, that will take four PCI-E lanes, and force the video system to degrade to 8x operations even with one video card. While that isn't an ideal scenario, the difference is very marginal on PCI-E between x16 and x8 for GPUs.

> **"ASRock isn't to blame: this is the direct end-result of Intel kneecapping the Z97"**

ASRock isn't to blame for these compromises: this is the direct end-result of Intel kneecapping the Z97 to make its X99 platform seem that much more impressive to workstation builders. Given the cost, however, anyone buying this board will be expecting the full feature set. Here, ASRock doesn't disappoint.

Along with all the PCI-E slots and the M.2 options, you get dual Gigabit LAN, eight USB 3.0 ports and the same number of USB 2.0 ports if you include headers, ten SATA III ports, two eSATA and even a Thunderbolt connector! We'd suggest that last feature is only really of interest to those that own Apple Mac hardware, though.

There are four DDR3 Memory slots that can handle 3200MHz modules if you overclock, and ASRock provides a lovely 12-phase voltage regulator precisely for that job. The only catch is that this board ideally needs a PSU that supports dual 8-pin ATX connectors, or the Hi-Density Power Connector, as it is referred. A software



Features

- Supports 5th and 4th Generation Intel Socket 1150 Xeon/Core i7/i5/i3/Pentium/Celeron Processors
- Digi Power, 12 Power Phase design, Multiple Filter Cap (MFC)
- Nichicon 12K Platinum Caps (100% Japan made high quality conductive polymer capacitors)
- Premium Alloy Choke (Reduces 70% core loss compared to iron powder choke)
- Dual-Stack MOSFET (DSM), NexFET MOSFET
- Supports Dual Channel DDR3 3200+(OC)
- 4x PCI-E 3.0 x16, 1x PCI-E 2.0 x1, 1x mini-PCIe
- AMD 4-Way CrossFireX and Nvidia 4-Way SLI supported by PLX PEX 8747 Bridge
- Graphics Output Options: DisplayPort, HDMI
- 7.1 CH HD Audio with Content Protection (Realtek ALC1150 Audio Codec), Supports Purity Sound 2 & DTS Connect
- Dual Intel Gigabit LAN
- 2x SATA Express, 10x SATA3, 1x eSATA, 1x Ultra M.2 (PCI-E Gen3 x4), 1x M.2 (PCIe Gen2 x2 & SATA, Supports 30mm, 42mm, 60mm, 80mm, 110mm M.2 devices)
- 8x USB 3.0 (4x Front, 4x Rear), 8x USB 2.0 (4x Front, 4x Rear), 1x COM Port Header, 1x Thunderbolt AIC Connector
- Supports ASRock HDD Saver Technology, Full Spike Protection, ASRock Cloud, APP Shop, A-Tuning, Full HD UEFI

“ASRock deserves a medal, because this is the nicest Z97 board we’ve yet seen ”

tuning application ‘A-Tuning’ is provided that you can use to get every last cycle squeezed out of your system, should such things amuse you.

in terms of getting the most out the Z97 platform, ASRock deserves some sort of medal, because this is the nicest Z97 board we’ve yet seen, but, here’s the rub: if you can afford to buy four identical video cards, then you can probably spring for an X99 motherboard, LGA 2011-v3 processor and DDR4, realistically. With the X99 you get 28 PCI-E lanes to do whatever you like with, rather than having to work with a (admittedly very handy and clever) fudge to make it seem that way.

As Z97 motherboards go this is very impressive, though it costs at least twice what you can get a more modestly featured design for. Therefore, it only represents a worthwhile upgrade If you’ve already got a good LGA 1150 processor, memory and video cards that you’d like to exploit. If you're starting from scratch, we would heartily recommend you save your money until you can pick up an ASRock X99 Extreme6 instead.

mm Mark Pickavance

A fantastically featured, but ultimately expensive, Z97 motherboard

D-Link DCH-M225

All around his house, Michael Fereday has been streaming his favourite music

DETAILS
- **Price: £36.74 (Amazon.co.uk)**
- **Manufacturer: D-Link**
- **Website: www.dlink.com**
- **Required spec: iOS, Windows, Mac, Android**

With the model number of DCH-M225, this D-Link offering combines wi-fi extender capabilities with Music Everywhere technology in a device that supports Windows, Mac, Android and iOS platforms. The device itself could easily be mistaken for a 3-pin power plug that looks as if it had been put through a bulking up session which results in body dimensions of 65 x 55 x 42mm (D x H x W).

Giving the device an once-over reveals a 3.5mm jack socket on the base, a small button labelled WPS on the right side and an LED light on the rear. Included in the box is a 150cm audio lead that allows the Music Everywhere device to be connected to an appropriate speaker outlet. Not surprisingly the WPS button is for linking to a wi-fi router, while the LED light will glow green to indicate when it is ready for action.

Along with the WPS option, D-Link offers a QR Mobile app that can assist when setting up this device. A QR code is provided in the Quick Installation Guide to help search for the appropriate app. Once installed on your mobile handset, this app runs a set-up wizard that searches for and identifies available networks including the all-important home network which needs to be selected.

Once a link has been established between the DCH-M225 and the home network, you can point your handset towards the DCH-M225 network and join the wireless network it has created. The resulting settings will be presented in a summary list. You then have the option to save this list.

Operating as a wi-fi range extender, this device needs to be plugged into a power socket located within a dead-spot area of the home network. While not offering the speed-demon performance of some devices, the DCH-M225 can perform at a reasonable rate, with speeds of up to 300Mbps possible. You could then leave and forget about the device.

Of course if you are intending on making use of the product's Music Everywhere capability then positioning could be more of an issue as the DCH-M225 will need to be in reasonable reach of the speaker(s) to be used. While the 150cm audio lead might be fine for some situations, you could be faced with needing to move the DCH-M225 to a location nearer speakers that can not be moved. If this happens then you need to be aware that the DCH-M225 will need to reboot itself, a process which could take between two and three minutes.

Music Everywhere allows you to stream music from a networked computer or mobile handset to speakers attached to the DCH-M225 device. In the case of the former method I was able to stream music from my work system using Windows Media Player. Having selected the tracks for streaming, I just need to use the Play To option to point the stream towards the DCH-M225 destination. Mac owners can make use of AirPlay to carry out the streaming.

Switching to my Android smartphone required the use of a different streaming tool. I opted for the DNLA supporting iMediaShare app. In order for the streaming to work, the smartphone needed to be on the DCH-M225 network rather then the default home network. As part of my testing I used a variety of standalone speakers and a five-year old tape/CD/Radio player unit. Audio quality, in all cases, was of a reasonable standard.

mm Michael Fereday

A little fiddly to set up but this device does what it claims to do

Transcend DrivePro 220

An already amazing dash cam, that offers so much more

DETAILS
- **Price: £130**
- **Manufacturer: Transcend**
- **Website: goo.gl/b7UOMn**
- **Required spec: Spare USB port, Windows XP+, Mac OSX 10.8.2+, Linux Kernel 2.6.38+**

We've reviewed a few in-car dash cams over the past months, and the burning question that's left in our minds is why cars aren't fitted with these to begin with? Having a dash cam can solve so many issues when it comes to accident reports, and insurance claims – and of course the safety aspect that comes with the knowledge that your driving, and of those around you, is going to be captured for the emergency services may well force the heavy footed individual to actually slow down and take care.

Transcend has so far produced some pretty impressive results when it comes to in-car recording. From the DrivePro range we've reviewed in the past, the 100 and 200 versions appeared to have everything you could possibly wish for or imagine in a dash cam. In all honesty, we were quite surprised to find that this new version, the 220, has managed to provide more features to help careful drivers.

The DrivePro 220 has a 1.8 aperture, low-light sensitive lens, a 3MP sensor and a built-in microphone and speaker. It weighs only 90g, and can be fitted to the windscreen of your car by either an adhesive backed mount or suction cup.

As with the previous models, Transcend throw in a 16GB SD card, which is capable of recording a good two hours' worth of HD footage, with older being written over when the card reaches its maximum limit except for emergency recordings which require a manual confirmed overwrite.

The same three-axis G-sensor as the other models use is in the 220 too. While it allows the camera to instantly start recording when sharp breaking or a collision is detected as before, with this version Transcend has added a Parking Mode that will automatically spring into life and record any detected movements or impacts that occur while the car is stationary.

This new version also includes a GPS Receiver that will log the GPS coordinates along with the time and date stamp of an event to the video footage it records. This will then allow you to accurately disclose your position to the emergency services in the unfortunate event of an accident, but it also doubles up as a log book of driving information when you hook the 220 up to a PC with the DrivePro Toolbox software installed. In such an instance, you can view the journey you've taken along with the relevant coordinates, speeds, times and any other information that could prove to be critical when dealing with the police or an insurance company.

If all that wasn't enough, Transcend has also added a Lane Departure Warning system that warns the driver when the car strays out of its lane – and a Forward Collision Warning system, which will warn a driver when their speed exceeds the road limit, and when they get too close to the car in front.

You can see then why we think every car should be fitted with this kind of technology by default. The benefits of having a DrivePro 220 fitted in your car are many. Not only are there the warning systems in place, and the GPS technology with G-sensor, but you can connect to the 220 wirelessly and via an iOS and Android app.

This is quite an amazing device, and one we're sure will impress the regular commuter or those whose livelihood is spent behind the wheel.

mm David Hayward

A singularly impressive in car recorder, with a long list of noteworthy safety features

Features

Dimensions: 70.2mm × 63.1mm × 34.5mm
Weight: 90 g (3.17 oz)
Display Type and Size: 2.4" color LCD
Image Sensor: Low-light sensitivity CMOS, 3 mega-pixel
Lens: F/1.8, 130° wide angle
G-Sensor: 3-axis
Microphone: Built-in
Speaker: Built-in
Resolution/Frame rate: Full HD (1920x1080) 30FPS HD (1280x720) 30FPS
Video Formats: H.264 (MP4: up to 1920x1080 30fps)

Etherium

Can this plucky upstart really take on the big boys?

DETAILS

- **Price: £25**
- **Developer: Tindalos Interactive**
- **Website: etherium-thegame.com/com**
- **Required spec: Windows Vista SP2/7/8 dual core 2.4GHz CPU, 4GB RAM, HD 5850/ Geforce GTX 560 or better, Internet connection, 5GB HDD space free**

Real-time strategy games come in many forms, but one of the most popular is undoubtedly the kind that emphasises mining resources and combat – names like *Command & Conquer*, *Age of Empires* and *Starcraft* naturally spring to mind. And now, hoping to join such illustrious company we have *Etherium*, a futuristic RTS game from Tindalos Interactive.

Based, as many such games are, on the idea of distinct warring factions, fighting over territory and resources, it doesn't seem to possess much originality in the story department, but frankly it doesn't need to. What really matters is how it plays. It certainly bears more than a passing resemblance to the Starcraft series, but can it actually hold its own against such stiff competition?

Well, the answer to that is both yes and no. Graphically, it looks decent, and although it doesn't ever really stretch into the realms of being truly impressive, the design is nevertheless decent. From the structures you build to the units you create, they all look the part.

So far, so good, and as you settle down to your first game, you'll have a fair idea of what to expect: you left-click a unit to select it, and then right-click an area on the map to make that unit move there. This is all standard stuff, and the tutorial does an effective job of filling you in on *Etherium*'s more particular characteristics, so anyone who's played an RTS before shouldn't have any trouble getting to grips with this one.

The specific mechanics of the game involve capturing demarcated areas of the map, which you achieve by commanding your construction units to built outposts and bases on monoliths, which appear in certain sectors of each map.

Once an area is under your control, you can build turrets to protect it, and if you're fortunate, you'll also find deposits of the eponymous etherium, a highly coveted and valuable substance, which you mine and then use as currency to buy more soldiers, buildings and so on. And, course, because this is real-time strategy, your opponent will be doing the same thing somewhere else on the map, hoping to gather enough resources and firepower to bury you.

As you'd expect, you can pay to upgrade some of the things you create, which will hopefully give you the edge when time comes for the final push. Doing so costs etherium, so you have to choose carefully what to improve and what to leave alone. You also get access to Command Skills, which are a set of abilities that, once used, have to be recharged before you can use them again. Some of these are common to all three of the game's races, while others are unique to each of the opposing forces, but all offer something that could potentially turn the tide in your favour.

Another way to improve your chances is to find sub-factions on the map, which consist of AI-controlled units going about doing their own thing. They seem to keep themselves to themselves, but it's possible to bring them over to your side, and then you get to control whatever vehicles and soldiers they have, recruiting them in your fight for domination. And if you're anything like me, you could do with all the help you can get.

I've played plenty of RTS games in the past, and although I don't consider myself to be an expert of any kind, I do think I should be able to do alright at medium difficulty settings in most titles. But with *Etherium*, I found myself being overrun by the computer within just a few minutes. No matter what I did when I was playing it, the AI-controlled enemy seemed to be able to spawn an endless number of military unit to come and destroy my bases, mere seconds after I'd built them.

To be fair, though, I was playing in the skirmish mode on medium settings, because the campaign mode wasn't available in the version of the game I was testing, so it might well be the case that the single-player missions are less harsh and ease you into the higher difficulty levels. For that reason, I'll set aside this specific criticism for now.

What's less easy to forgive, however, is the game's other weaknesses. For a start, the field of view seems horrible close-up, and no amount of scrolling the mouse wheel would allow us to see a useful amount of the map at once. The ability to zoom right in and see your structures up close is all well and good, but it doesn't really help that much when you're planning a large-scale mission.

That said, such grand plans seem to be out of the window anyway, because the maps are much too small (which is probably the reason the AI opponent seemed to be on us so fast), and there's very little to discover. Perhaps this makes for more intense battles and shorter games, but if you enjoy building stuff, then you probably won't be too happy with this – not that there's much to build, because *Etherium* is pretty limited in terms of what you get to create.

Taking all of this into account, it feels almost exactly like an Android game with PC controls, but it doesn't come with a price to match. At £25, it's cheaper than your average full-price PC release, but it doesn't have enough to it to justify the cost, especially considering you can pick up a copy of the far superior *StarCraft II* for around £10. Bearing that in mind, while *Etherium* might be a competent RTS title, it's not the best, so why wouldn't you just spend your money on something that is?

mm Anthony Enticknap

Reasonably well made but not an essential buy

GROUP TEST

External Hard Drives

It's amazing that even in this ultra-connected world, there's still room for a good old-fashioned external hard drive by your side. Whether it's for portable backups, security, media storage or whatever, an external hard drive can accommodate your needs.

David Hayward has six to test and tries to see which are worth splashing out on.

External Hard Drives

Transcend StoreJet 25H3

DETAILS
- Price: £52.28
- Manufacturer: Transcend
- Website goo.gl/FDfKsW
- Required spec: Windows XP or later, USB 3.0 for best results

Transcend has over the years proved itself to be quite the formidable player in the external storage market. The StoreJet range of portable drives are one such example and have won just about every award going.

The Transcend StoreJet 25H3 is an impressive looking external hard drive with a number of features that makes it stand out from the crowd. For starters, this is a rugged device that's capable of withstanding impacts and falls thanks to the rubberised, anti-shock outer case and advance internal drive suspension. Basically, this is all thanks to an extra layer of silicone that encases the drive itself, which is then encased in a hard plastic shell. It may sound extreme, but it's actually a very good selling point.

The shock resistance is not something to be taken lightly. This thing has been rigorously tested by US military drop test standards and is now credited with the MIL-STD-810F rating. Of course, that doesn't necessarily mean you should try to play cricket with it, but should you have a sudden attack of butter-fingers, then at least your data has a far better chance of survival than any other portables drives available.

The 25H3 comes in a variety of capacities, from 500GB through to 1TB and 2TB versions, and it's available in either blue or purple coloured cases. It's also reasonably compact, measuring just 131 x 80 x 19mm for the 500GB and 1TB models, to 131 x 80 x 24.5mm for the 2TB model. In terms of weight, the 500GB and 1TB models weigh 216g, with the 2TB model weighing 284g.

It's also USB 3.0 compatible and features 256-bit AES file and folder encryption when using the accompanying Transcend data management software. There's a one-touch button located on the top corner of the drive, which will activate, through the prior setting up of the software, a backup routine and synchronise any data.

Added to that is a quick reconnect button to the side of the unit, which will re-enable the 'safe to remove USB hardware' feature in Windows without the need to unplug the device from the PC.

The accompanying USB 3.0 cable terminates with a double plug at the PC end, one for power over USB 2.0. Naturally this means you'll have to make sure you have enough USB 2.0 ports available to accommodate it, but thankfully USB 3.0 can provide enough power over a single connection. The cable is reasonably long, about a metre and a half, but we did think that should your available USB ports be separated by the length of a laptop, then you might run into some connection difficulties.

With FlashBench we managed to achieve a 1GB file read of 140MB/s and 114MB/s write. Those are pretty good by our reckoning.

The Transcend StoreJet 25H3 is an impressive external hard drive and one we really liked. Transfer speeds are good, the included software is more than capable of keeping up with most users and, of course, the drop proof capabilities are beyond exceptional. All in all, it's one to recommend.

Lacie Christofle Sphère

DETAILS
- **Price: £370**
- **Manufacturer: Lacie/Christofle**
- **Website: goo.gl/Gf3xfN**
- **Required spec: USB 3.0 port for best results, Windows XP or later, Mac OS X 10.5**

Every so often we get something through our door that defies the norm. It could be the latest and greatest device or something so radically expensive it comes accompanied with a pair of ex-sumo wrestler bodyguards. More often than not, though, it's the design of the device that makes it stand out from the crowd.

The Lacie Christofle Sphère is, at first glance, more of a desktop ornament than technical product. However, this isn't just a work of art; it's also a 1TB, USB 3.0 external drive, which is why it's in this group and not in a copy of House & Home.

Let's get the design aspect out of the way first. The Lacie Christofle Sphère is a silver-plated, hand-crafted steel sphere from French designer Christofle, who apparently is a pretty big deal in its native country.

> **"You'll need to keep a cloth nearby for emergency polishings"**

It is very fetching, that much we have to hand to Lacie. The highly polished surface looks pretty natty next to the latest MacBook, and thanks to a flattened bottom, it sits comfortably on the surface of a desk without risk of it rolling off.

The bottom of the drive hides a recessed mini USB 3.0 port, where you'll naturally plug in the single power and data cable. Amusingly, the included cable is a standard-looking, one-metre, black cable, which when plugged into the Sphère looks exceedingly out of place and more like an afterthought of 'Oh yeah, how are we going to power this thing?'

Read and write speeds for our 1GB file came to 108MB/s read and 90MB/s, write which aren't brilliant, but in all honesty if you own one of these, then the chances are you're the sort of person who cares little for how long it takes for a file to copy over.

The Lacie Desktop Manager software that comes with the Sphère is competent enough and includes a backup manager, one that will automatically back up your data every set number of hours; an Eco mode that will save up to 90% of the energy used in standby; and folder level AES 256-bit encryption. It's a complete enough package and for the most part very easy to use.

The Lacie Christofle Sphère is an okay external hard drive, but there are a few things we need to address. The first is the fact that it costs £370 (you do get free shipping from Lacie, though). The second is, although an amazing-looking device, you'll struggle to keep it looking shiny and reflective. As soon as you remove it from the box, even with clean hands, fingerprints will begin to appear on the polished surface and generally ruin the visual appeal. Okay, so it's not a big deal, but considering this is an item of high-value technology art, you'll need to keep a cloth nearby for emergency polishings.

Clearly this isn't your average external hard drive. Yes it looks fab and would no doubt be splendid adorning the desktops of trendy city offices, but for us normal (or maybe just semi-normal) folk, it's an indulgence that really isn't worth the cost.

Samsung D3 Station

DETAILS
- Price: £83.67
- Manufacturer: Samsung/Seagate
- Website: goo.gl/QHGH0C
- Required spec: Windows XP or later, USB 3.0 for best results

The D3 Station range from Samsung is a little misleading. Although it clearly states Samsung on the top of the drive and on the box too, the D3 Station range of external drives are actually manufactured by Seagate.

The issue of joint ownership when it comes to support of a product is one that often rears its ugly head in the technology industry. Usually you'll simply return the product back to the shop you purchased it from, but occasionally you may require something a little extra from the manufacturer. This is where the D3 Station fails from the off, as neither company appears to want to admit to owning it.

The D3 Station comes in either 1TB, 2TB or 3TB models, which is certainly more than enough for modern backups or media storage. And it comes with a USB 3.0 interface, with a separate power supply, as well as the USB connection, around the rear of the unit.

It's a fairly unassuming looking external drive, but that's probably only because we've been admiring our reflections in the polished surface of the Christofle Sphère. It doesn't look like some kind of abomination that needs to be hidden away from sight, but it's also pretty bland, with its two-tone grey colour scheme.

> **"It seemed to vibrate on our desktop unlike anything else we've ever tested"**

Looks to one side, the D3 Station performed less well than expected. The 1GB file we tested was read at just 72MB per second, with the write speed coming in at an equally poor 55MB per second. Clearly, this is a drive that isn't designed for speed.

This was also an exceptionally noisy drive, and it seemed to vibrate on our desktop unlike anything else we've ever tested. The continual rumble of the vibration and noise was enough to drive us suitably mad after about an hour or two of use, and that noise and vibration increased significantly when the drive was in use.

However, the pre-installed Samsung Drive Manager software was adequate enough for the majority of users. With it you can set and perform a backup, set up Samsung Safekey data security and compression and run a few drive diagnostic tools.

Overall, although on the face of it the Samsung D3 Station is an okay and adequate external hard drive, the poor read and write speeds combined with the noise and vibration from the unit make this a rather less than average addition to the group.

Added to that, though, is the apparent lack of support and ownership. This alone may be enough to deter most business class users, as well as home or small office users too.

All in all, this isn't an external drive we'd recommend in a hurry. And considering it costs £83.67, we think your money could be put to much better use.

WD Elements 5TB

DETAILS
- **Price: £119.99**
- **Manufacturer: Western Digital**
- **Website: goo.gl/hqtQPU**
- **Required spec: Windows XP or later, USB 3.0 for best results**

We couldn't do a group test of external hard drives without at least one appearance from Western Digital. The company seems to release a new external drive model every ten minutes, and it's quite a chore trying to keep up with what's new. More to the fact, the previous models are generally of such a decent build that they're still around and being sold despite being released some years ago.

The WD Elements Desktop line has been around for quite some time and ranges in size from 500GB through to a whopping 5TB, which is what we're reviewing in this instance. This is a usual WD-looking product, one that resembles a book on a shelf and is about as big as a novel, measuring 165 x 48 x 135mm.

The obvious selling factor here is the extremely large capacity. 5TB is a huge amount of space, even in today's age of super-high-resolution photo collections and video libraries that would rival that of a Blockbuster store, not to mention most people's music collections.

Accessing and writing to that space is thankfully a blessing, mostly due to the USB 3.0 connectivity, but also because this is a WD unit and is therefore a brand you can happily rely on. In our tests, the 1GB file we used was written to the drive at a measured rate of 101MB per second and read at an equally good 135MB per second.

In terms of software, WD has included a trial version of SmartWare Pro on the pre-formatted partition. SmartWare Pro is a WD product, so it's really quite good. With it you can set up various backup methods (including a cloud backup to Dropbox) and recover files and folders within seconds thanks to the friendly interface and easy setup. However, you only get 30 days' use of the software before you have to buy the full version. But at least by then you'll be certain as to whether you want it rather than a third-party product.

The WD Elements 5TB external hard drive is a great solution for most people, regardless of whether they're home or business users. The amount of storage is pretty spectacular, and the design looks okay too. Transfer speeds aren't the fastest, but they're more than enough for regular backups or if you're in a rush to get a copy of something saved.

It's a pity the SmartWare Pro software is only a trial version, because you would think WD has made enough profit from the sale of unit. Maybe it hasn't? Either way, the drive itself is certainly good enough for us to recommend.

It is a tad expensive, though. At £119.99 it's not something you'd get on a whim. We imagine that the cost is more to do with the 5TB drive capacity, so if you want the same specification, more or less, and you don't need quite that much space, then the 2TB, 3TB or 4TB models will suit you better.

iStorage diskAshur Pro

DETAILS
- Price: £269
- Manufacturer: iStorage
- Website goo.gl/AinqC6
- Required spec: Any OS, USB 3.0 for best results

If security of data is something you're concerned about, especially with regard to data being stored on a portable external drive, then you're not going to find anything quite as impressive as the solutions from iStorage.

In particular, the diskAshur Pro looks like it may well be used by the likes of MI5. Here we have a portable hard drive measuring 19 x 84.5 x 120mm and weighing just 190g. A built-in USB 3.0 cable extends to a reasonable 120mm from the unit, and the toughened, rubberised finish adds an element of water-proofing and ruggedness. It's available in a range of capacities, from 500GB to 1TB, 1.5TB and 2TB, with the 1TB version being reviewed here.

The dominating feature and main security selling point is the large numeric keypad on the front of the device. With this you can set an admin and five unique user PIN codes up to 16-digits in length. This, in combination with the 256-bit AES-XTS military, hardware-level encryption, means that whatever you store on there will be secure from prying eyes unless they know the PIN.

In addition to this, there are also some very nifty features that sound like they come straight from Q-branch. You can set a unique Self Destruct PIN which, when entered, will instantly destroy all PINs and the contained data, and then it creates a new encryption key. It's protected against brute force attacks to gain access to the PIN, and it's OS free and works on any system including thin clients. And thanks to the general overall ruggedness, it can even withstand a shock or impact up to 1000G when not in operation and 300G when in operation.

> "Very nifty features that sound like they come straight from Q-branch"

Transfers speeds are pretty dire, however. The 1GB file was written at a speed of 60MB per second and read at 90MB per second. It's not lightning fast, that much is clear.

In the box you get the device itself, along with a padded nylon carry case, a quick start guide and a USB extension cable. The instructions, as mentioned, are easy enough to get to grips with, and after a short while you'll get used to the 'plug in, enter PIN, access drive, lock, unplug' way of doing things.

The only concern we had was the lifespan of the keypad. It's certainly robust enough and well engineered, but what if the numbers rub off? Or what if it develops a fault and one of the buttons fails to be detected when pressed? Thankfully, the two-year warranty iStorage supplies when registering diskAshur will take care of that, so you're in good hands at least.

While it's easy to preach the values of security, the diskAshur Pro may well be overkill for the average home user. If all you're doing is storing a few downloads, then there's little point in spending the small fortune that iStorage wants for the diskAshur. However, if you work in an environment where security of data is paramount, then £209 (for the 500GB version, rising to £329 for the 2TB model) may sound like a small price to pay.

Toshiba Canvio Desktop

DETAILS
- Price: £74.99
- Manufacturer: Toshiba
- Website: goo.gl/CMvSCH
- Required spec: USB 3.0 port for best results, Windows XP or later, Mac OS X 10.5

It feels like an age since a Toshiba external hard drive was available for testing, as the company appears to be winding down the external drive production in favour of consumer home entertainment electronics. Obviously, that's not the case here.

The Canvio Desktop is a part of Toshiba's Store.E range of drives, which offer a cloud backup solution through the included version of NTI Backup Now EZ – which we assume covers the .E part of the title. The drive itself comes in various capacities, from a single terabyte through to an extremely capable 6TB In this instance we managed to get our hands on the 3TB black-and-white model.

This is a USB 3.0 drive enclosure, and it certainly looks good, a bit like one of those posh mint chocolates you get at Christmas time. Only this one measures 129 x 42 x 167mm, which would be a pretty big chocolate even by our standards.

While the drive itself looks okay, the power brick that comes with it is a little bulky and firmly establishes that this is more of a static external backup solution, compared to one or two of the examples we've already had that are happily portable. It's not a problem, of course, but if you do need to take your data from your desktop, you'll have to lug the unwieldy power brick with it.

> **"A pretty basic external drive, albeit one that looks reasonably good"**

The included software offers a complete backup and restore solution that will keep both home and business users quite happy. Plus there's the option to back up any data to the NTI Cloud solution. As well as backup, you can password protect files and folders, but it lacks any decent encryption algorithms that most of the other external drives offer out of the box.

Transfers were okay, with the 1GB file being read at a rate of 110MB per second and written at 92MB per second. Again, though, they're hardly the fastest speeds on record but will suffice for daily incremental backup routines or the occasional quick file store.

There's not a huge amount else to consider with the Toshiba Canvio Desktop, to be honest. It's a pretty basic external drive, albeit one that looks reasonably good. The 3TB version costs roughly £74.99, but we're fairly sure you could find one a little cheaper if you take the time to shop around.

All in all, it's an okay drive. We probably wouldn't bother so much with the NTI Backup Now EZ software but would rather use something of our own to configure and schedule backups. But on the whole it's functional enough and does a good job.

micro mart
8 Quality
7 Value
7 Overall

Transcend StoreJet 25H3

For an external hard drive, the Transcend StoreJet 25H3 has it all. Not only is it tougher than anything else we've tested, it's also quick and portable, and the included software is good.

WD Elements 5TB

The WD Elements is a stable, reliable external hard drive. It's quick, looks okay and comes with the sort of satisfaction you'd expect from a WD product. It's a pity, though, that the software is only a trial version.

How We Tested

Each external hard drive was tested on a Windows 7 and Windows 8 PC with USB 3.0. We used FlashBench, version 2010, to collect an average read speed and transferred via Windows Explorer a 1GB media file to test write speeds.

	Transcend StoreJet 25H3	Lacie Christofle Sphère	Samsung D3 Station	WD Elements 5TB	iStorage diskAshur Pro	Toshiba Canvio Desktop
Price	£52.28	£370	£83.67	£119.99	£269	£74.99
Dimensions	131 x 80 x 19mm	134 x 134 x 125mm	180 x 129 x 47mm	165 x 135 x 48mm	120 x 84.5 x 19mm	129 x 42 x 167mm
Weight	216g	500g	743g	950g	190g	300g
Reviewed Capacity	1TB	1TB	2TB	5TB	1TB	3TB
USB Type	USB 3.0	USB 3.0	USB 3.0	USB 3.0	USB 3.0	USB 3.0
Read File Speed For 1GB	140MB/s	108MB/s	72MB/s	135MB/s	90MB/s	110MB/s
Write File Speed For 1GB	114MB/s	90MB/s	55MB/s	101MB/s	60MB/s	92MB/s
Software And Extras	Military drop tested, three-year warranty, Transcend Data Management software	Lacie Desktop Manager software, looks pretty spectacular	Samsung Drive Manager software	Trial version of SmartWare Pro	Super secure keypad, data self-destruct mode	NTI Backup Now EZ software with cloud access

Your Letters

Windows 10 And POP

I read with interest the letter from Ted Oswald (What's up POP? Micromart Issue 1355) where he bemoaned the demise of the POP protocol within Windows 10. My own experience has been somewhat different. Some time ago in my XP days I used Outlook Express (OE) as it seemed simple enough for me to use as my email manager. Upon upgrading to Windows 7, I decided to move on to Live Mail. This I found to be very similar to OE and we got along just fine.

I set up Windows 10 on a spare lap top and tried the bundled Outlook offering. It appeared to be very unfriendly in both appearance and settings and so I was a tad disappointed. Before writing to Jason, who usually sorts out my major issues, I downloaded and installed Live Mail. I only set up a low-use email account as a test (an @sky.com using **pop.tools.sky.com** and **smtp.tools.sky.com**) and sent several test emails, both from within W10 and on my W7 desktop. All worked correctly.

I took the plunge and downloaded W10 onto my desktop and after a couple of re-installations (my fault I believe) all seems to work fine. I downloaded Live Mail (selecting just live mail from the windows download) and installed it. My system crashed, but after a reboot all seemed fine. I opened Live Mail and after signing in, set up my three @sky.com accounts, plus my one @btinternet.com account and of course,my obligatory Gmail account. I selected the manual option and used the pop settings aforementioned. I have had no problem using Live Mail at all, in fact it runs as it did under W7. In a separate chat with a support agent I was advised that W10 does not support Live Mail and I may therefore be riding for a fall. For the meantime, though, I will continue as I am.

must say that I am enjoying the W10 experience. The system seems very simple and intuitive to operate and access to most of the settings and tweaks are readily available. I hope that others have a similarly positive experience. The one aspect I don't like is linking just about everything to the cloud. I have downloaded Libre Office (something I met through one of the Linux distros I run on a couple of other machines) and whilst opening and saving documents is not perfect it is good enough for me. I prefer to be able to type letters as necessary without the internet. There will always be downtime for one reason for another and. while I know a hard drive isn't for ever, I don't wish to be subject to the vagaries of the latest BT technician. I hope Ted gets his emails back on track and continues to enjoy W10 as I have done.

Maybe Jason or Aaron could be persuaded to write an article documenting their experiences of W10 and how they used their extensive knowledge to solve any problems encountered. That would make interesting reading as long as you edit out Jason's jokes (not really, I enjoy his sense of fun).

Nigel Palmer

What's Up Pop

With reference to your correspondent Ted Oswald I too am 'old' at 75 and an avid reader of your mag.

I have W10 installed on my 'test' machine and everything I have loaded on to it so far has worked including Windows Live Mail. This uses POP3 protocol for handling incoming mail and is a free download from Microsoft.

I wonder if Ted's problem with POP is elsewhere.

John G Johnston

Remembering Doom

In issue 1353 you had a small piece on this momentous game. You also ran an article with details of *Minetest* and the community of modders connected with *Minecraft*.

The link between the two is because a similar group of talented individuals has been hard at work on *Doom* in the 20+ years since it was released.

Look for the following mod clips on the well known video upload site: *GZDoom* (including increased range of selectable resolutions), *Brutal Doom* (imagine the outcry if this was what *Doom* had actually looked like in back in 1993) and *Zandronum* (improved visuals amongst other things).

This is a just a small selection of available enhancements out there if you care to look for them, there are many others. Also look out for 'Doom wads' if using your favourite search site. These are new levels to play, and the number (and quality of many) is astonishing.

And all are free to download and use.....

John Cully

GET IN TOUCH...

By email
letters@micromart.co.uk

By post
Micro Mart
30 Cleveland Street
London
W1T 4JD

Online
forum.micromart.co.uk

SUBSCRIBE NOW!

Subscribe to micro mart today and save on the single issue price.

Each issue of *Micro Mart* will be delivered directly to your device each week.

SEE NEXT PAGE FOR SET-UP INSTRUCTIONS

HOW TO SUBSCRIBE...

...on an iPad or iPhone

STEP 1 Return to the *Micro Mart* library

STEP 2 Choose your subscription term and tap twice on the 'price' box

STEP 3 Choose whether to create an optional PixelMags account

STEP 4 Enter your Apple ID password to confirm

Download on the App Store

...on a Kindle Fire

Kindle Fire subscriptions come with a FREE one month trial.

STEP 1 Tap 'Free Trial Subscription' in the *Micro Mart* library

STEP 2 Chose your subscription term from the drop down menu on the popup that appears

STEP 3 Tap 'Subscribe'

available on kindle fire

...via the Zinio app

STEP 1 Search for *Micro Mart* via the search box in the Shop tab

STEP 2 Tap the 'Subscribe' button

STEP 3 Choose whether to create an optional Zinio account

STEP 4 Enter your Apple ID password to confirm

Subscribe to *Micro Mart* today and save on the single issue price

The £60 Mobile Technology Challenge

Ian McGurren examines whether out of date means out of use

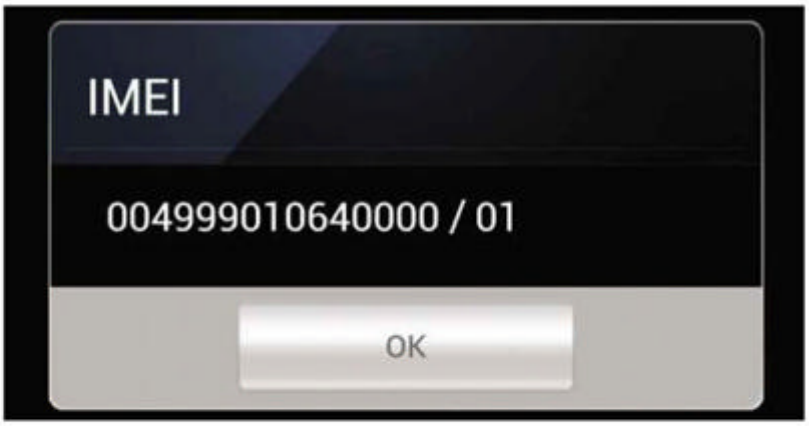
Mobile technology is moving at a frightening pace. What many currently perceive as 'the world of mobile technology' is the world that uses the announcement of Apple's first iPhone as year zero. There are many who argue with this, but there's a clear divide between what was being released before and what was released after the iPhone was first unveiled to the world. Now, that moment seems a distant starting grid in the marathon that the industry is still running, but in reality, it was only just over eight years ago. That same year, *The Simpsons Movie* was released, *The Big Bang Theory* started, David Tennant was a hyperactive Doctor, and Leon Jackson won *X Factor* – and what a career he went on to have... In the intervening time, we have gone from the iPhone to the creation of the App Store, full-touch screen phones, mobile data, HD video recording and playback, tablets, Android and the explosion of apps that have changed our social landscape. Even if you don't buy into mobile technology, it's not an exaggeration to view it as one of the most fundamental changes to how we live that we will see in our lifetimes.

Such is the pace, however, that in the name of progress, profit and a little one-upmanship, there is year-on-year growth in specifications. Naturally the manufacturers will have you believe that the instant their new generation model is released, your current generation model is hopelessly outdated. The most touted spec at present is '2K screen', meaning the device has a 1440 x 2560 pixel display, higher

What To Look For In A Phone

There are many cheap second-hand phones these days, but how do you decipher which of them are worth your time and money? Firstly, pay attention to the condition; it'll give an indication if the phone has been cared for. Then check if it's on your network or is unlocked (if not see below). Next, any phone needs to be able to keep up with the modern devices, which mostly means can it run a modern OS. This should be at least Android 4.3 Jelly Bean, iOS 7 or Windows Phone 8.1 – a quick Wikipedia search should tell you what it can do, even including unofficial updates. For Android, at least 1GB of system RAM is needed, and any device needs storage of 8GB or more. Finally, where possible buy from a shop or online store that offers a warranty, in case of problems. If buying from an individual, you should also check the phone's IMEI number on **swappa.com** for blacklisting (i.e. reported lost/stolen).

The Nexus 4's high-quality design and finish still looks superb nearly three years on



*If you want to find out the IMEI of a phone for checking, enter *#06# into its dialler*

"The spec race has one useful side effect, and that's on the prices of second-hand devices"

than any non-4K television, and all other displays pale in comparison.

But is your device unusable with a mere 1080p or even 720p screen? Can it still work with only four or even two cores in its processor? Yes, of course it does. In fact, most devices released in the last two or so years should still be able to perform perfectly well the tasks most of us need them for.

The spec race has one useful side effect, however, and that's on the prices of second-hand devices. Other than Apple, most mobile technology plummets in price as soon as it is superseded. Bad news if you shelled out for it when it was new, but a goldmine of technology bargains for those of us who don't mind not having the latest and greatest.

Let's put it to the test. We've set an arbitrary limit of around £60 each for a phone and a tablet to see how well they perform. This includes the everyday functions expected of one of these devices, how the hardware itself holds up physically, if it's able to still run modern operating systems and applications, whether it still represents value for money, and its comparable experience with a current-generation device.

Mobile Phone

Device details and cost: LG Nexus 4 16GB, from eBay for £50 (additional £10 on a replacement rear).

The Hardware: The LG Nexus 4 was Google's flagship Nexus handset in 2012 and has a quad-core Snapdragon S4 Pro CPU, 2GB RAM and came with Android Jelly Bean 4.2. The original Nexus 4 had a Quadrant benchmark score of around 5,000, highly competitive at the time, though unremarkable now. The Nexus 4's camera was / is reasonable, and the device is not expandable. Like all Nexus phones, ours was unlocked to all carriers.

Changes Made: The Nexus 4 has a price range from around £90 for a grade-A unit to around £60 for a working but lower-grade unit. Our device was in good condition other than a shattered rear glass panel. The process for replacing the rear on a Nexus 4 is straightforward, and a replacement rear was very cheap, meaning this was a good way to get a decent device cheaply. Devices with minor damage can be worth taking a chance on, but if it's a broken screen or worse, it could become too much time and effort.

In addition, we took the opportunity to update the OS before we began to use the device. In the case of the Nexus 4, it's a Google device, so it gets the latest version of Android, though at this point it wasn't available over-the-air. This meant flashing the image from Google's site to the phone – a fairly straightforward operation but not as easy.

The Galaxy Tab 7.7 in all its Ice Cream Sandwich-powered glory

"The Galaxy Tab 7.7's Super AMOLED Plus panel looked amazing then and still looks rich and vibrant today"

Performing General Functions: In use, our bargain was perfectly adept at being a phone, calls were handled without any problems, and it held a good signal. Messaging was also fine, whether via SMS, email or even apps like WhatsApp. Using Chrome browser, pages loaded quickly and looked exactly as they should. Scrolling was fluid, and zooming did not cause the Nexus 4 to stutter.

On the social front, Twitter and Instagram had no trouble either, both running perfectly fine and without any crashes. 2D games had no problem running, and even older and well optimised 3D games, such as *Dead Trigger 2*, performed admirably and without problems, albeit with the quality knocked down a little.

Running A Current OS: Running a current operating system on a device from a few generations ago can always be hit and miss. With the recent iOS 8 update, for example, many users reported their older iPhones had become substantially less responsive. In many cases, there are no 'official' updates to many older devices, but if the user learns how to flash a new image to a phone or tablet, they have a way of extending the life of the device beyond that of manufacturer support.

In the case of the Nexus 4, running a fresh flash of Android 5.0 Lollipop transformed the phone from a competent device to the equal of many mid-range devices of the current-generation. Every facet of the new OS worked superbly and without stuttering or freezing, and it looked fantastic. Battery life, the Nexus 4's previous Achilles heel, was now lasting into a second day instead of barely finishing the first. There appeared to be no bugs either, in itself unusual when updating.

Running Current Applications: The Nexus 4 was able to run all the applications we threw at it almost

What To Look For In A Tablet

Much like phones, there are a plethora of cheap tablets littering pawn shops and the like up and down the country. In reality, however, many of them are not longer worth the PCBs they're printed on. But how do you know what to go for? Tablets, more than phones, live or die on their screens, with the cheaper models frequently having a low resolution and narrow viewing angle. Look for a nice IPS screen with a resolution of at least 1280 x 800 (preferably Retina models for iPad). For OS and storage, the same rules apply as for phones. So while that iPad 1 may be tempting, its old OS, limited storage and low-resolution screen mean it runs barely any apps these days, and those it does are slow or look suboptimal.

flawlessly. Those that did perform slowly or unusually tended to have more of a problem with Lollipop's new ART runtime than they did the Nexus 4's hardware.

Not much phased our Nexus 4, but some heavier social media applications, such as Facebook did have some problems. While they worked as well on our handset as on any current generation device, there was some overall system slowdown, though this is more likely down to how unwieldy the application has become in general. Bigger games were noticeably slower, however, partly because of their reliance for more modern GPUs and partly due to the restricted storage on the device itself.

New And Cheap

Previously, the old adage of 'pay cheap, pay twice' could be applied to bargain phones and tablets. Some are not worth their outlay, such as no-name 'bargains' from TV shopping and voucher sites – avoid these as a general rule. But there are genuine bargains to be had at the bottom end of the market. For phones, Motorola's Moto E and Microsoft's Lumia 530 are great value for around £60 or less. In terms of tablets, Tesco's first-generation HUDL can be found in-store for £69, and Windows 8.1 tablets, like the Linx 7 frequently dip down to around £50. Also worth keeping an eye on are the Argos and Currys refurbished stores on eBay, with bargains to be had and a warranty too.

Warranty And Repair

Most older devices will have outlived their initial warranty periods, usually one or occasionally two years. In addition, there are some manufacturers, such as LG, who only offer the warranty to the original purchaser, prohibiting warranty transfer. Apple, on the other hand, offer a warranty on the device itself, regardless of owner, including any extended Apple Care too. If you have the device's serial, you can check the state of this using their online warranty checker. If you're buying from an individual, there's a good chance there's no warranty. Buy from a store, however, and you can get 30 days up to a year. This comes at a premium, with shops costing more than individuals, but sometimes that warranty is worth the extra. Of course, if you flash custom firmware on it and cannot reverse it, consider your warranty void too.

Compared: For around £60, the best new phone would probably be a Lumia 520 or a Motorola Moto E. The Nexus 4 runs rings around both of these devices in terms of power, speed and design. The devices it would be better compared to, such as the Moto G or Sony Xperia M4, cost at least £99 and don't have the premium design or larger RAM of the Nexus 4.

Value: For around £60-80, the Nexus 4 is staggering value for money. Were it released today for that price, even for £99, it would win plaudits the world over.

Verdict: As you can see, you can spend around £60 on a second-hand phone and come up trumps. The Nexus 4 acquitted itself superbly and would represent an excellent buy for a frugal smartphone user. There are other bargains to be had around that price too. The aforementioned Moto G comes up around £65 second-hand and is nearly as good, just not as refined.

At the same time, however, there are some to avoid, such as the ubiquitous Samsung Galaxy Ace. It's a serviceable phone but was behind the curve when released.

The £60 Tablet

Device details and cost: Samsung Galaxy Tab 7.7 Wi-Fi, from eBay for £62.50

The Hardware: The Galaxy Tab 7.7 was the device right in the middle of the Apple versus Samsung court case in 2012, and it was even banned from sale in some countries. This accounts for its relative rarity – something that plays into the savvy eBayer's hands. Hardware-wise, the Tab 7.7 is a beefed-up Galaxy S2, with a dual-core Exynos 4210 CPU and a then-healthy 1GB RAM. But the headline here isn't the insides, it's the screen, a 7.7" 1280 x 800 Super AMOLED Plus panel (that's right, no Pentile layout) that looked amazing then and still looks rich and vibrant today.

Any Changes Made: In terms of hardware, the device was in a decent condition, mostly due to Samsung using a full metal chassis. The operating system, however, was a different story. Originally the Tab 7.7 was loaded with Android 3.2 Honeycomb, an OS that's really not suitable for current-day use. Official OS updates took it to 4.1 Jelly Bean but, this time it's unofficial firmware to the rescue, in the shape of Cyanogenmod 12, based on Android 5.0 Lollipop.

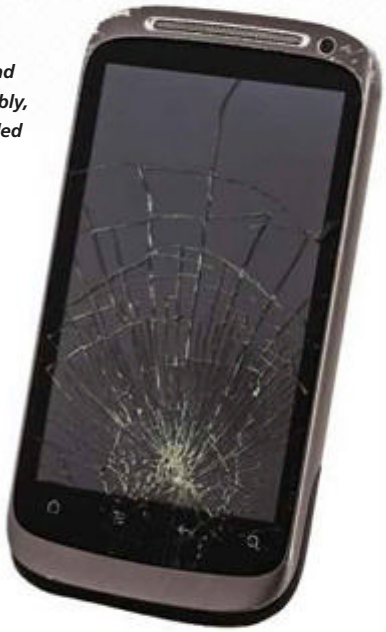
Performing General Functions: Can the Galaxy Tab 7.7 do the basics? Yes it can, but the experience isn't as smooth as on the Nexus 4, for example. Using the built-in browser instead of notorious memory hog Chrome, the experience was fine, albeit not quite fluid or instantaneous. Heavier pages also took their toll on the Tab 7.7, with sites like the Daily Mail's front page really dragging it down (though some argue that may not be a loss). The Gmail app worked well, though, Twitter ran without problem and at a reasonable pace. We opted for Facebook via the web to preserve background processes, as the current app had problems. YouTube also faired better via the web.

Running A Current OS: As you can see, the Tab 7.7 does indeed run Lollipop, though we had to tailor it for the best experience. The version flashed had the bare minimum Google apps framework, enough to allow the Google Home app and applications such as the Play Store and Gmail to run, but without having the ton of other apps that will barely see any use taking up resources. We also made a few tweaks to speed up the Tab 7.7, such as removing all the transition animations, regularly clearing memory caches and keeping an eye on apps that wanted to auto start and drain resources.

Running Current Applications: A gorgeous screen can only get you so far, and running apps beyond the basics tested the Tab 7.7. Simple apps, such as Wunderlist, were fine, as they barely consumed resources. Games were less successful, with 3D gaming with modern titles out of the question, if only to conserve battery. The Tab 7.7 runs many apps to a usable standard, but it's likely this performance will slow as app updates and newer apps demand more of the already struggling CPU.

Compared: For around £60, there's an awful lot of no-name rubbish, most of which will perform worse than the Tab 7.7. There are some exceptions, such as a refurbished Tesco Hudl, Google Nexus 7 2012, even some Windows 8.1 Tablets. But there are none that have that Super AMOLED Plus screen.

Value: For £60 you get a mostly serviceable tablet with a very good screen but limited future use. If

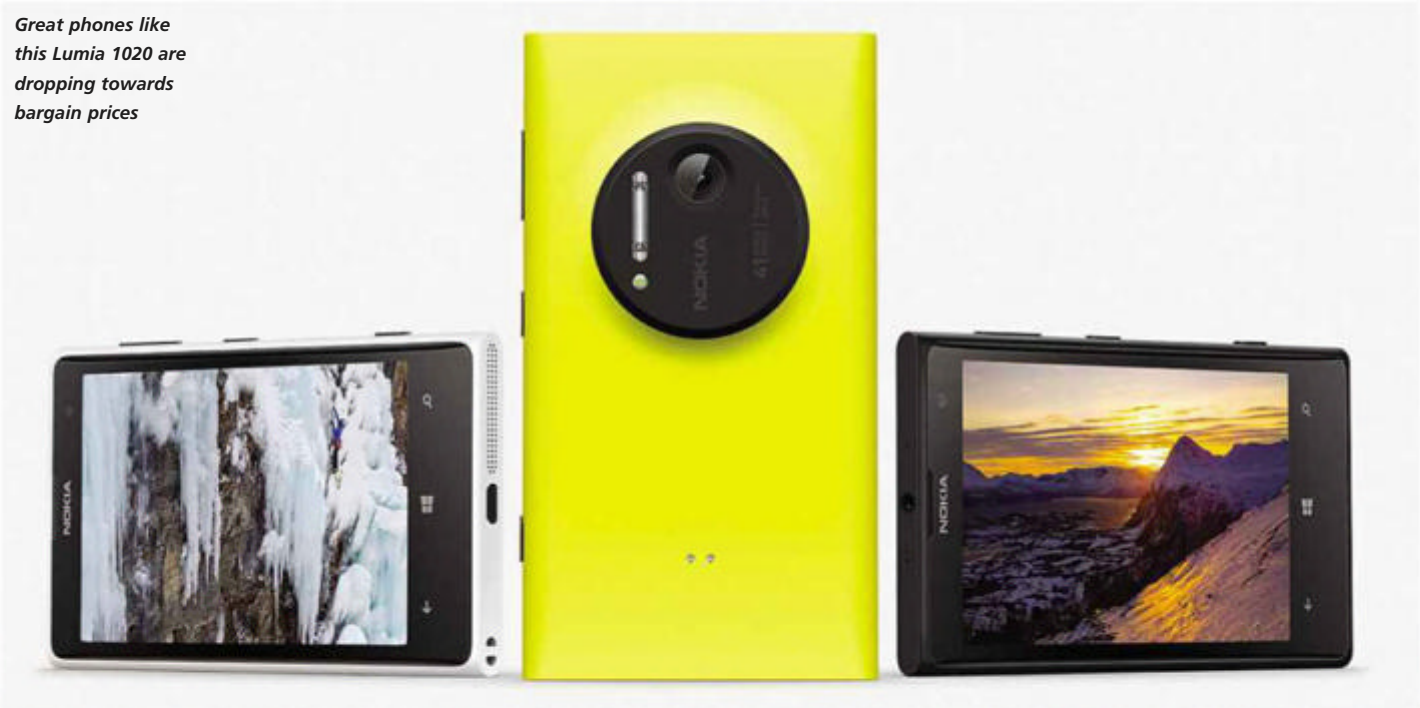


➤ While screens can be repaired, they cost a lot and require disassembly, so are best avoided

“Can you really shell out what many people pay for a tank of petrol and get something good in return? Yes, most definitely, there are bargains and savings to be had”

Fixer Upper

As we showed with the Nexus 4, there are bargains to be had if you’re one to get your hands dirty. Grubby phones can sometimes easily have their shells replaced, some even have screens that aren’t too tough to fix. You might also be a dab-hand with flashing, bringing something left behind by its manufacturer into the modern age. Don’t overreach, though: check **ifixit.com** first and see what you might be letting yourself in for.



Great phones like this Lumia 1020 are dropping towards bargain prices

Unlocking

A common problem is that phones can often be locked to a network carrier. This is a double-edged sword, as locked phones are often cheaper than unlocked but may also be difficult to get unlocked. Thankfully, most phones can be unlocked by purchasing a code on eBay, often for only a few pounds – HTC, Samsung, LG are often like this. However some are not so straightforward, with iPhones only unlockable via the service provider, some of which will only unlock for the first owner. Others, such as Lumia phones, are just as expensive and can take over a week. The smart idea is to check eBay for prices before committing.

Quadrant

Benchmarking as a tool to measure the power of one device against another has been around now for ages, and Android has a fair few benchmarking apps to do just this. Top of the tree is Quadrant, an app that tests the usual features (2D draw, 3D draw, maths, IO speed, etc.) to give an overall score at the end. In and of itself, it means little, but it's a good way of judging the power of a phone or tablet against others, such as older ones against newer ones. Even if you're unable to run it on the device itself, a quick Google for the Quadrant score will give a good indication of its power.

“There are some manufacturers, such as LG, who only offer the warranty to the original purchaser, prohibiting warranty transfer”

you're not bothered about that screen, however, or if you're not confident in flashing it past Android Honeycomb, it's fair to say that it's probably worth saving up a bit more for a newer, more powerful device.

Verdict: While it's not quite the home run that the Nexus 4 was, the Tab 7.7 has a lot to offer, including the best screen you'll see on a cheap device for some time yet. But if you're not aware of its shortcomings, then you'll likely find it a bit of a bind to use, especially if you're used to something more responsive. Proof of the pudding came in us often choosing another tablet over the Tab 7.7 to check something if there was one available. This isn't to say that £60 second-hand tablets are useless, though – far from it. But useful ones are only just starting to appear, and the Tab 7.7 is actually one of the better ones. The market is changing, though, and in the next year or so we'll begin to see far more powerful devices, like the Nexus 7 2013, begin to fall to this kind of price. For now, though, the Tab 7.7 is a gorgeous but underpowered device, and it's not one for the future.

The £60 Tech Challenge – The Verdict

How does older tech stack up, then, and can you really spend what many people pay for a tank of petrol and get something good in return? Yes, most definitely, there are bargains and savings to be had. The oldest a device should be is around two to two-and-a-half years old, because beyond that, there have often been large enough changes in the mobile world to give older hardware a tough time. Around 18 months is the sweet spot for value and power, with cracking devices like the Nokia Lumia 1020 starting to head towards £125, and even the still-capable iPad 4 also springing up well under £200.

As for £60, it's still hit and miss – for every Nexus 4 or HTC One X, there will be ten underpowered wastes of time. Surprisingly, the Microsoft factor is starting to weigh in here, though, with very capable tablets and phones launching for under £100, meaning they'll be in the £60 bracket after less than a year, and with that they may bring down other prices.

There's a lot of old technology about, and right now, an awful lot of it is useless and better off recycled. But we are just entering the age where more and more of the old technology is still very capable and is becoming very cheap. But in order to feast on this ever growing banquet of bargains, you still need to do some research and not just jump at the first shiny handset you see in Cash Converters. With time, though, you can get an awful lot of technology for barely any money – and who wouldn't like that? **mm**

If you can get Lollipop on the device, it may well be worth a shot

Remove Browser Hijackers, PUPs And Adware

Roland Waddilove shows how your PC becomes infected with unwanted extras and how to clean up your web browsers

If you've owned a PC for any significant amount of time, then at some point, you've probably had to deal with potentially unwanted programs (PUPs), browser hijackers and adware on your computer. They're easy to install but often difficult to remove. They're stubborn and can even appear to remain on the system even after they've been uninstalled. How do PUPs get on your computer? What do they do to it? How do you get rid of them? What tools can help you?

I'll be answering all these questions, and by the end of the article you'll have a clean, ad-free and fully functioning browser again. Browser hijackers, PUPs and adware affect web browsers in different ways, but here I'll be covering the main three: Internet Explorer, Chrome and Firefox. If you have all three browsers on your PC when PUPs, toolbars and adware are installed, they can affect all three at once, tripling the amount of work required to clean up the computer. It's not hard, though, and you just have to go about it in a methodical manner.

A common type of PUP is one that is installed into the web browser, which can add a toolbar to Internet Explorer and Firefox, add an extension to Chrome, redirect searches to a different search engine in all browsers, change the browser's start page or new tab page, and display unwanted adverts. They can even replace the adverts that normally appear on a web page with their own alternative ones.

Catch A PUP

People confuse PUPs with malware like viruses, and they think that somehow the computer has become infected, possibly by visiting a malicious or hacked website, opening an email or attachment, or downloading a file. They complain that their security software did not block the virus and they're amazed at the ineffectiveness of the anti-virus program they use. "I have the latest security software, but I still got infected," they say, and "I have scanned the computer with X, Y and Z, and they come up with nothing. How do I get rid of this virus?"

Many PUPs and toolbars are not viruses, which is why anti-virus software does not block them. They may be irritating and they're often unwanted, but that doesn't mean

they're a classed as a virus. What one person calls a PUP, another might call a useful utility, although I have yet to meet someone that actually liked one, apart from the developer that made it.

If PUPs and browser hijackers are not viruses, how do they get on your computer? A common method is through free software. They are frequently bundled with freeware, shareware or free trial software, and when you install the software, you install the PUP, hijacker or adware too.

The problem is that many people sleepwalk through the installation of software. Well, installations are boring, after all. Their mind wanders and after seeing several dull pop-up windows that they have to click through, they stop reading what is on the screen and just click the Next button as soon as it appears so as to get through the installation as quickly as possible.

On one of those installation windows may be an option to install the PUP, and it is automatically selected for your convenience. You click away without reading the text, and the PUP is accidentally installed without you noticing. The K-Lite Codec Pack is an example of how PUPs, browser hijackers and adware get on to your computer.

The K-Lite Codec Pack is a useful collection of video codecs that enable you to play almost any type of video format in Windows. It's very common, and lots of people install it. Like a lot of free software, though, it contains a PUP that hijacks the browser. In this particular case it can easily be avoided, and eagle-eyed PC users will spot it, but you do need to pay attention when installing the software.

During installation of the K-Lite Codec Pack, there must be a dozen windows to click through, or at least it seems like that many – I didn't count. Towards the end, when your mind is numbed and you have given up reading what they say, is one that offers to install the PUP.

Bundled with K-Lite Codec Pack is MyStart, which is a potentially unwanted program. It is a relatively harmless one, but it still gives people problems, and it's a good example of what they do.

The boxes to install the toolbar, set the home page and change the search provider are already ticked for your convenience, and all you have to do is click Next. If you've stopped reading the seemingly endless installation screens, you will miss this and MyStart will be installed. Stop! What you should do read every screen and when you get to this one, clear the ticks at the top and tick the box at the bottom. This offer of free software and the changes it makes to the browsers on the PC should be declined.

See how these things can be avoided if you're careful? Many PUPs rely on you not paying attention during installation, but others, more devious ones, make the options hard to see. For example, they may be displayed in a small font on a text-heavy screen of legal terms and conditions, which no one ever bothers to read. In the worst cases, some PUPs may not even tell you they're being installed or enable you to opt out.

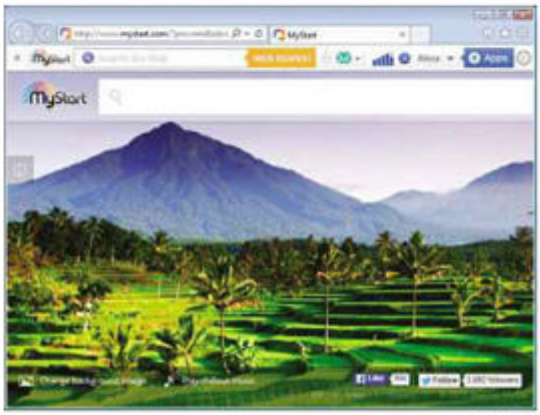
PUPs like MyStart change every web browser that is installed, including Internet Explorer, Firefox and Chrome. Take a look at the browsers afterwards in the screenshots. They're actually quite attractive, but the changes could come as a complete surprise if you weren't paying attention during the installation of the K-Lite Codec Pack.

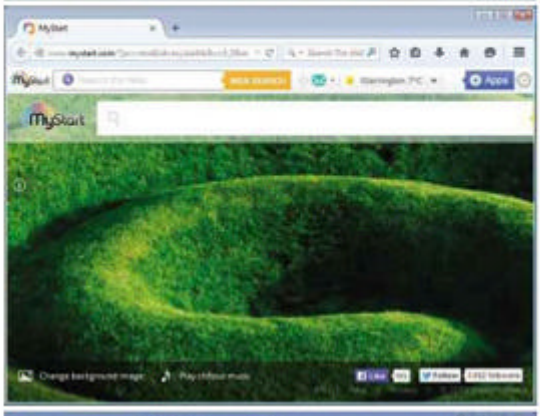
Web browsers are becoming better at preventing this hijacking of the home page and the addition of toolbars, extensions and add-ons. Chrome for example, displays a message in the top right corner of the browser. It tells you that MyStart has been added, and you're prompted to enable it or remove it before continuing to use the browser. When you search the web by typing the search term directly into Chrome's address box and the search engine is not Google, a pop-up message appears asking if this is the search page you were expecting. It offers to restore the original setting.

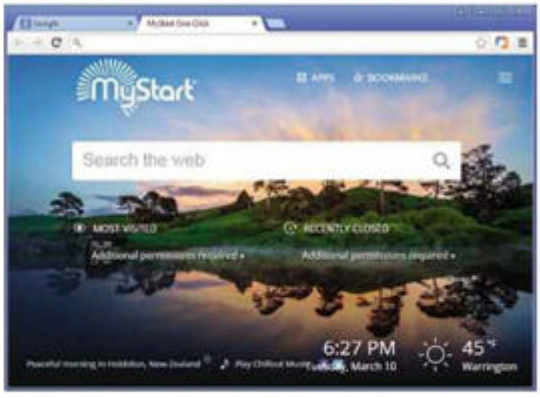
Firefox and Internet Explorer do similar things to a certain degree,

Watch out for bundled extras when installing software you've downloaded

Internet Explorer, Firefox and Chrome after accidentally installing MyStart







but the warnings don't seem to work because people either don't notice, don't understand what they're agreeing to or think they can easily remove the PUP.

Clean Up The Computer

If you want to remove these unwanted changes and extras in your web browsers, the place to start is Programs and Features in the Control Panel (Add or Remove Programs if you're still using XP). Look for the unwanted software. There's an obvious entry for the MyStart toolbar that I installed, but it can be quite difficult to spot when there's a lot of software installed on the computer and the name is less obvious. Just examine each item and ask yourself what it is and whether you need it. Check the name and the publisher columns. An uninstaller utility like IObit Uninstaller (**iobit.com**) or Wise Program Uninstaller (**wisecleaner.com**) helps to remove all traces of the software.

If only it was as straightforward as uninstalling the software. For some reason, these unwanted extras never have any problems installing themselves, and the installer works perfectly. The uninstaller does not. Try opening your browsers after uninstalling the PUP, and you'll find that little, if anything, has changed.

Clean Up Internet Explorer

Is possible to uninstall these unwanted extras completely? It seems not, and you now have to clean up each web browser manually. Let's look at Internet Explorer first. Start the browser (the desktop version if you're a Windows 8 user), go to the gear menu and select Internet Options. On the General tab in the home page section, delete everything in the box and enter the URL of the website you want to start with.

Click the Tabs button and in the section 'When a new tab is opened' click the button and select an option, such as 'The new tab page' or 'Your first home page'. You should not need them, but on the Advanced tab is 'Restore advanced settings' and 'Reset'. It won't do any harm to click both buttons.

Close Internet Options, go to IE's gear menu and select 'Manage add-ons'. Select 'Toolbars and Extensions' on the left and 'All add-ons' below, then look through the list of items displayed for anything that should not be there. PUPs, toolbars and add-ons have so many names it would not be possible to list them, so just check each item and Google them if you're not sure. Ignore add-ons from well-known companies like Microsoft, Adobe, your security software and so on. If you find something, select it in the list and click the 'Disable' button in the bottom-right corner.

Select 'Search Providers' on the left and on the right, select the search engine you would like to use and click the 'Set as Default' button. You can then select the ones you don't want and click the 'Remove' button. You can trim it right down to just Bing or Google if you want. PUPs always add their own website and set it as the default search engine, which is why the wrong search engine is used.

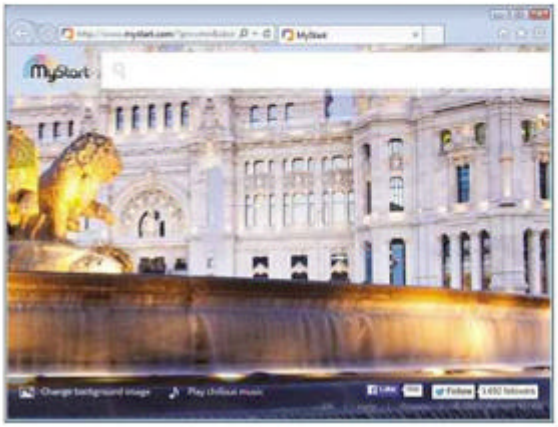
Clean Up Chrome

PUPs are installed into every browser, so after cleaning Internet Explorer you then have to clean Chrome too. Sometimes an extension is installed, so enter 'chrome://extensions' into the address box and examine each one closely. If there are any that should not be there or that you do not want, click the trash icon to delete it. MyStart added an extension to Chrome and was easily found and deleted.

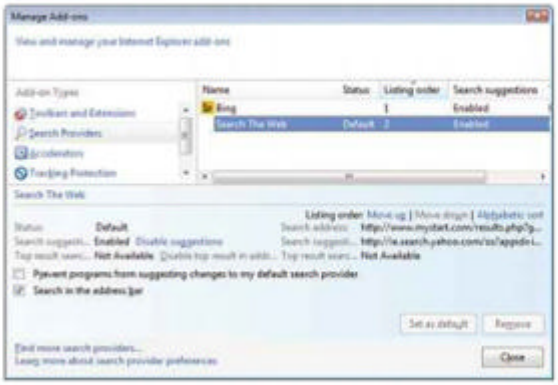
There's more, though, and like Internet Explorer, the search engine can be changed. Go to the menu button and select Settings. Click 'Manage search engines' in the Search section. Whenever Chrome comes across a search box on a web page, it adds the site as a search engine. The list of search engines is therefore long, but the only one of importance is the one set as the default. Find the Google entry, mouse over it and set it as

Chrome has detected that the search engine has been changed and provides a restore option

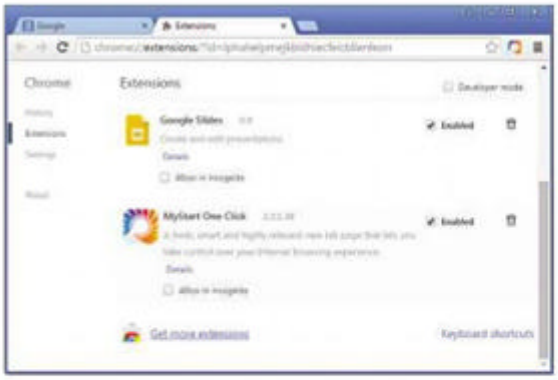
Internet Explorer after uninstalling the MyStart toolbar. It clearly hasn't worked



Search The Web is set as the default. Change it to Bing, then delete this entry



Look for unwanted extensions in Chrome and reset the search engine to Google



> **Many PUPs and toolbars are not viruses, which is why anti-virus software does not block them**

the default. Mouse over any other search engines you don't want and click the icon to delete them.

Return to Settings and in the 'On startup' section where it says 'Open a specific page or set of pages', click 'Set pages'. Enter your favourite start page, such as www.google.co.uk, mouse over any other start pages and click the cross to delete them.

Clean Up Firefox

It's the same story with Firefox; you need to remove add-ons and extensions, reset the home page and delete unwanted search engines. Click the menu button and select Add-ons. The PUP has most likely installed a plug-in or extension, so select each of these on the left and examine the list of items displayed for anything that should not be there. The names of PUPs are too numerous to list, but they're often obvious.

To the right of the address box is the search box, and on the right of the magnifying glass is a little arrow. Click it and select 'Manage search engines' or 'Change search settings' (the wording is different in each Firefox version). A list of search engines is displayed, from which you can select and remove ones that you don't want. Look for the PUP's search engine and delete it. In recent versions of Firefox, there's an option to set the default search engine. Use it to select your favourite. Finally, go to the General tab in Settings and enter the URL of your preferred start page in the Home Page box.

Useful Tools

One of the most useful tools for cleaning up a computer and removing PUPs, adware and toolbars is Malwarebytes Anti-Malware (**malwarebytes.org**). The free version is all you need, and it can be kept installed on your computer alongside your regular security software.

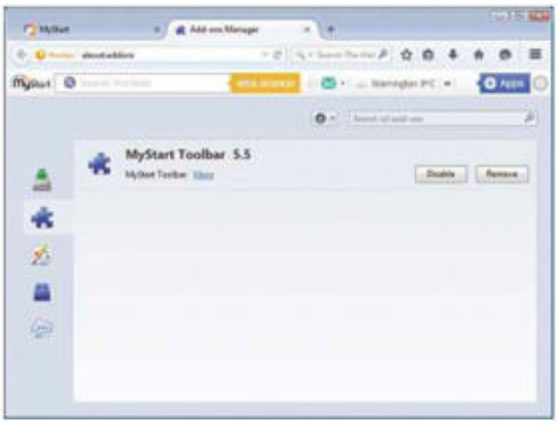
The main reason why it's so useful is that it recognises many programs that other security software misses. Technically many PUPs and similar items are not malware, and anti-virus software ignores it, but Anti-Malware recognises that most people don't like these things and offers to remove them. You might, however, still need to manually clean the browsers by resetting the home page, search engines and removing add-ons and extensions.

Symantec, best known for its Norton range of security products, offers the free Power Eraser utility (**bit.ly/1HbxF0H**), which is a browser hijacker removal tool. It doesn't need installing and will simply run from from its .exe file. Go to the Advanced Options and click 'Scan Now' next to 'Unwanted Application Scan'. Unwanted items found by the scan can be uninstalled. This tool can also be used to perform a rootkit scan too. PUPs are not rootkits, but if you have one type of malware, you might have another, so it's worth checking.

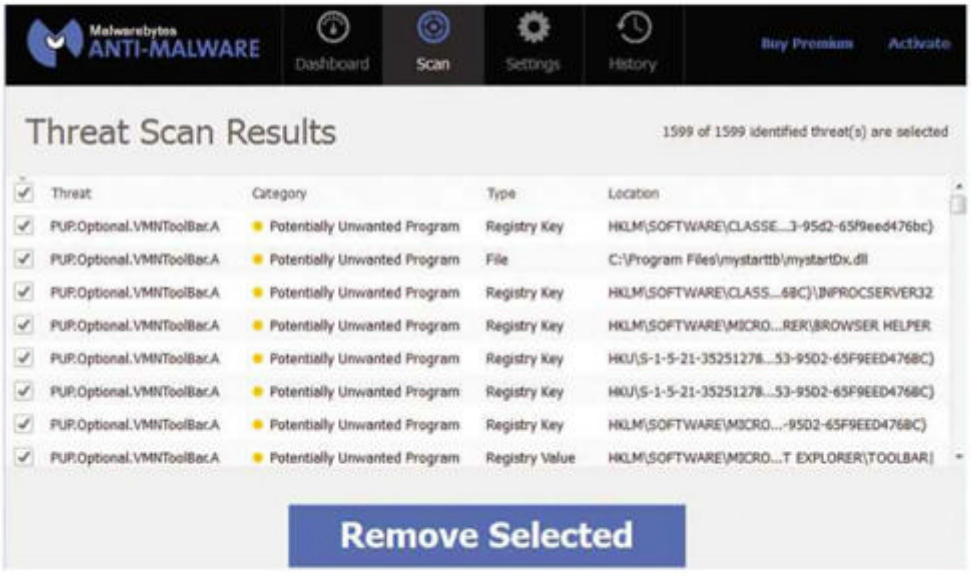
AdwCleaner (**bit.ly/1xGfwzJ**) is another free tool to keep on your computer. This is yet another application that will scan for and remove unwanted software like PUPs, toolbars and hijackers. Like Norton Power Eraser, it doesn't need installing, so you just run it from the Downloads folder and scan the computer.

Avast Browser Clean (**bit.ly/19F8VQP**) is another useful browser clean-up utility. You don't need to have Avast Antivirus installed, as it's a stand-alone tool. **mm**

Check for unwanted plug-ins and extensions in Firefox and remove them



Malwarebytes Anti-Malware is one of the best tools for removing unwanted software



Step By Step:

ZX Spectrum 128k To VGA Output

David Hayward digs out his old computer and hooks it up to something a little more modern

We recently had the pleasure of reviewing a modern add-on for our aging but still perfectly capable ZX Spectrum 128k 'Toastrack'. However, when setting everything up we came across an problem, stemming from the modernisation of technology.

The ZX Spectrum 128k is 30-odd years old, which is getting on a bit in terms of technology. The TV we were using for the review is mere months old, smart, connected to the internet and capable of displaying more colours and higher resolutions than the human eye can probably perceive in multiple dimensions. It's quite advanced. And in being so ultra-modern, while fully able to connect to every modern device known to humankind, it's not exactly compatible when the user tries to plug in a device that's as old as the company that made the TV.

The 128k 'toastie' was the last ZX Spectrum made by Sinclair before being sold to Sir Alan and having such wonderful additions bolted on like tape decks and disk drives. As a result, it had some limitations despite the added extras that were included from the previous Plus model. One of these limitations was the lack of a suitable signal for blanking for a SCART port, which was now becoming the standard higher resolution connection on TVs, when the Spectrum was connected via its built-in RGB socket.

While this wasn't too much of an issue for the old RGB monitors and RGB-to-SCART connected TVs, due to the fact that a user could manually tune the RGB inputs, modern TVs need that blanking signal and won't allow for a manual tweaking of the RGB input. Plus the aerial connector on a Spectrum won't work too well with a modern, Freeview-enabled TV, as everything is all automatic and 'smart', and again eliminates manual user tweaking.

The way around this is provide a 5V power supply with a 100ohm resistor to pin 16 to cover the blanking for the SCART port. This can get a little messy, and if you don't know what you're doing, then there's a good chance that either your expensive TV or, worse still, your beloved Spectrum may go pop and refuse to work ever again. It's worth noting that the Spectrum +2A and onward never suffered from this problem, because they had a 12V power supply and fed the blanking signal on the RGB-to-SCART with the necessary 3V needed for a suitable signal.

So we had a fantastic TV that was utterly useless with the machine we wanted to have connected to it. And after some serious head scratching, we came up with a plan to get the Spectrum outputting through the RGB connector to VGA. That way we could use it with our current monitor setup and the new TV, since it too has a VGA port.

More Hurdles

It wasn't quite as simple as we first thought, though. Although there is a healthy supply of Spectrum 128k RGB-to-SCART leads, shifting that data from SCART to VGA, or anything else more modern, appeared to be yet another major hurdle.

We tried a variety of SCART-to-VGA and SCART-to-HDMI convertors, but they all failed in a multitude of ways. In short, the concept of a Spectrum 128k to VGA was looking quite bleak.

Problems That Crop Up

There are bound to be a few problems when doing something like this, especially with the unpredictable nature of old technology being married to new.

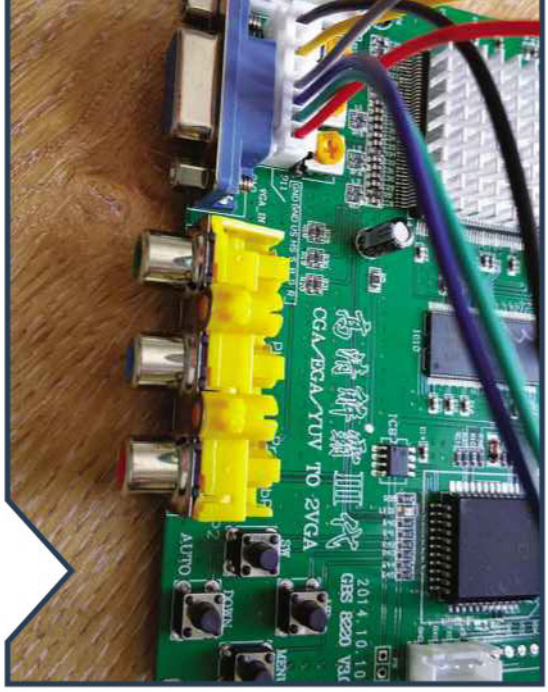
Here are a few solutions to the problems we found along the way:

No display: Check the RGB connector on the GBS side and that the wires are fully inserted into the RGB port on the Spectrum.

Everything is green: Chances are there's a loose wire or you've put the wrong wire into the wrong pin.

It works one day but not the next: A bit of an odd one this. One day it worked, the next it didn't, despite nothing being moved, only powered off overnight. Anyway, we found that by swapping the grey wire from the GBS side out of the plug to the point next to the yellow wire, it reset everything and the unit worked again.

Absolutely nothing but the GBS menu works: You might need to check the power to the Spectrum or the Spectrum itself. We had a dodgy power supply, which we managed to test by using a SCART-to-HDMI converter. The picture didn't display correctly, but we then knew the power was the problem.



STEP BY STEP

Plug in the GBS RGB connection

The RGB port on the back of the Spectrum

The GBS-8220, the plug we need is in the bottom left of the image

That was until we came across an amazing little device from JammaBoards, the GBS-8220.

The Solution

The GBS-8220 is a clever PCB that allows arcade machines and older technology to connect to modern displays. It was originally designed to allow older arcade cabinets to be serviced with newer flat screen monitors, while still keeping the original game boards intact. The arcade owner could then take advantage of the low power consumption, low cost and better quality screens available without having to resort to CRT ex-display models.

It supports CGA, EGA, VGA and YUV component signal inputs; VGA outputs from 640 x 480 through to 1360 x 768; auto scanning and RGB/HV inputs; plus it was only £15.88 from eBay with £2.99 postage.

The GBS-8220 would, in theory at least, allow us to connect the Spectrum's RGB port to an external PCB that would sort the signal out and display to VGA.

STEP 1

Thankfully, the GBS-8220 comes with a set of wires already connected to a plug for RGB input but is sadly lacking a 5V power supply. A quick trip to the local Maplin solved that. As you can see from the screenshot, the PCB is pretty self-explanatory. The part we're interested in for this project is the RGB socket, which is located between the single, blue VGA input (next to the yellow component inputs) and the three screw setting ports.

We need to start by plugging in the included RGB plug and unravelling the connected wires.

STEP 2

With the GBS-8220 connected, we now turn our attention to the back of the Spectrum and its RGB port.

The wires from the GBS-8220 RGB plug are open, so although you'll need to eventually solder them into an eight-pin DIN plug, we can for the time being (and for testing purposes) just poke them into the holes in the RGB port on the Spectrum. It's not ideal, but it's not intended as a permanent solution.

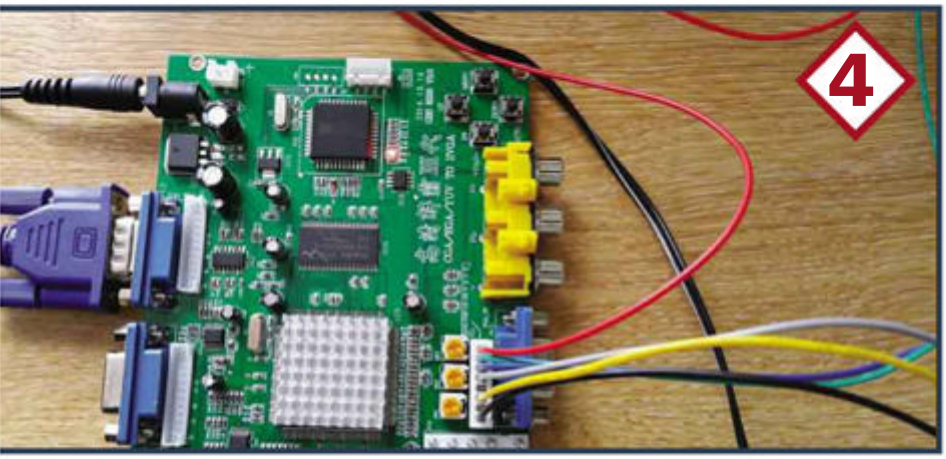
After some intense Googling, we finally managed to find out what the pin outs from the Spectrum's RGB port were, as per the image:

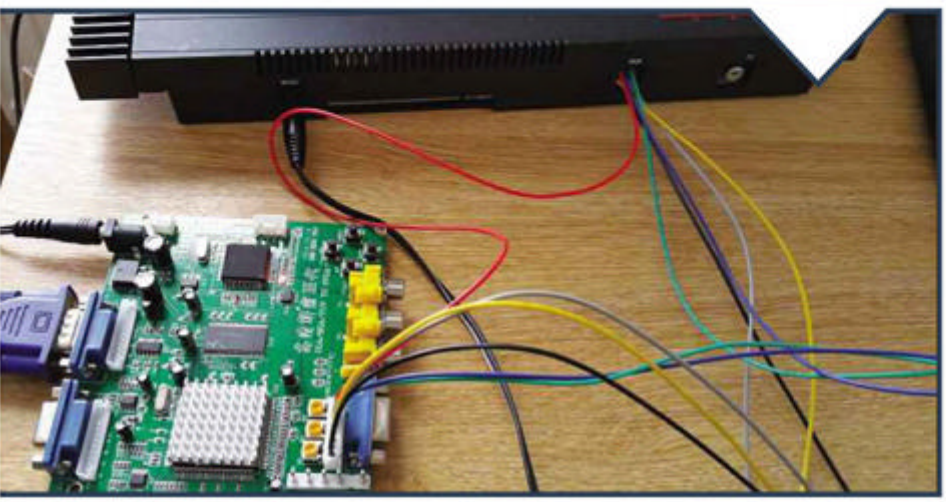
Pin 1 – composite video PAL
Pin 2 – Ground
Pin 3 – Bright Out
Pin 4 – Composite Sync
Pin 5 – Vertical Sync
Pin 6 – Green
Pin 7 – Red
Pin 8 – Blue

This translated on the GBS-8220 side, with wire colour, as:

Place the 128k where you can get to the RGB pins

➤ *The RGB port on the back of the Spectrum*





➤➤ *Plug in the VGA to the GBS*

➤ *And power to both the GBS and Spectrum*

- Black wire at GBS GND to Spectrum Pin 2
- Yellow wire at GBS VS to Spectrum Pin 5
- Grey wire at GBS S to Spectrum Pin 4
- Blue wire at GBS B to Spectrum Pin 8
- Green wire at GBS G to Spectrum Pin 6
- Red wire at GBS R to Spectrum Pin 7

STEP 3 With the relevant wires in hand, simply poke them into the holes in the RGB port on the Spectrum. You'll find that the plastic on the wire is just thick enough to allow the end to fit snugly into the port pins.

STEP 4 Now we need to provide a monitor output and power to the Spectrum and the GBS-8220.

With a standard VGA cable, one end hooked up to a monitor obviously, plug the other end into the GBS-8220 using the right-hand VGA port of the two available next to each other at the top of the board – the top being the opposite end to the RGB plug that we're using.

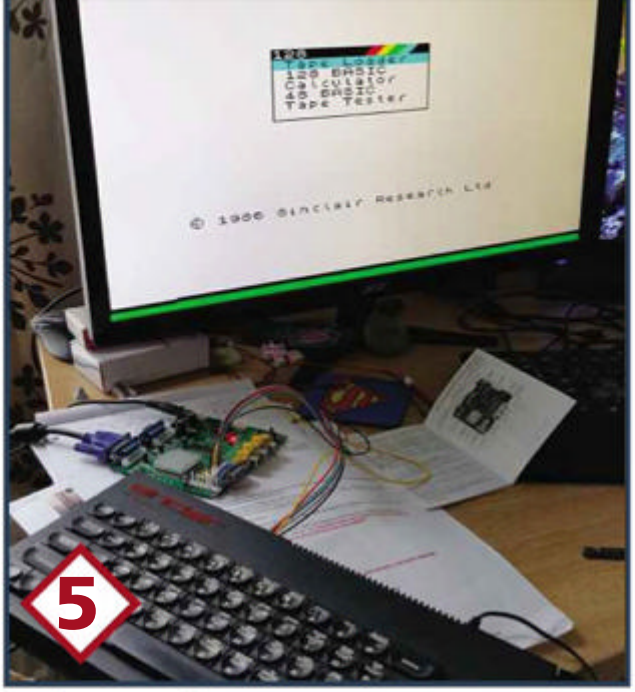
Now connect the Spectrum and the GBS-8220 to their respective power sources, and with any luck when you power on the monitor and change the input to VGA you should be seeing the famous Spectrum 128k menu, albeit a little distorted.

STEP 5 The image on the monitor is more than likely to be a little off, either horizontally or vertically. Helpfully, the majority of the accompanying instructions for the GBS-8220 are in Chinese, except for a small bit at the back that has been roughly translated.

Also, the menu settings for the GBS-8220 OSD are in Chinese too. But if you press the Menu button, which is the right-hand button in the arrangement of four found on the right of the board, then navigate the last sub-menu item and press Menu again – to enter the sub-menu – then you'll see English as a language selection, and you can highlight it and select with the Menu button once more.

Once the menu is in English, you'll be able to select the geometry sub-menu from the main Menu and alter the horizontal and vertical settings for the display.

STEP 6 In essence, that's it. You won't have any sound through this connection; you'll have to fit a 3.5mm audio lead to a set of speakers form the Spectrum's mic port, but for the sake of getting the spectrum up and running with a VGA monitor, the job is done.



The image is likely to be a little off, so you'll need to enter the GBS OSD

The OSD menu is in Chinese, but a quick browse through reveals an English option

List Of Ingredients

As you would expect, not everything you'll need comes in a tidy, neat package. You'll need to shop around a bit for the following items (we used these, so we'll assume you will too).

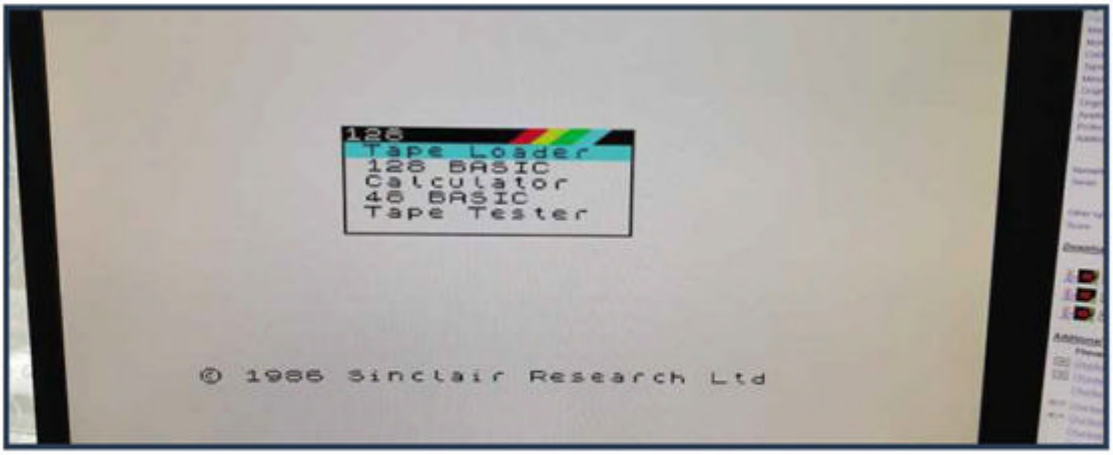
GBS-8220 – Found on eBay for about £15 minus postage: goo.gl/rSalGj
ZX Spectrum 128K Toastrack – Bit obvious, but again head to eBay. Can be very expensive, though
5v power for GBS – We had one lying around, but something like this should do: goo.gl/k1YGOg
VGA cable – To hook up to the monitor and the GBS. Again, we had one lying around, but this should work: goo.gl/MdNNPQ
Eight-pin male DIN plug – You'll need this if you're going to solder a permanent solution: goo.gl/lP0eF7
Stuff for soldering – Self-explanatory for soldering work.

Of course, as we said before it's not really a decent-looking or permanent solution. To make it so, you'll need to solder on an eight-pin DIN connector to the naked wires of the GBS-8220 RGB and then cover the length of wires in a heat shrink wrap. And you could really do with tidying up the GBS-8220 itself inside some kind of box or behind the TV. Perhaps you could use an old Spectrum Microdrive unit to house the GBS. It might be big enough, and it'll have the original logo too.

Conclusion

Admittedly, it's a lot of faff for getting a 30-year old computer to work with a new TV. You could just buy a +2A or above from eBay for £50 and a £10 RBG-to-SCART cable from the Retro Computer Shack relevant for that model. It'll work on a modern TV, and it's a lot neater.

But where's the fun in that? **mm**



With the menu in English, you can alter the image

All being well, you should now have the Spectrum outputting via a monitor

The Best Of Windows 8 App Store

Don't let the concept of an app store scare you away, says Keir Thomas, who looks at 10 gems to be found in Windows 8's offering

The idea of a centralised store where apps can be bought is entirely logical but is simultaneously one that die-hard PC users have a hard time swallowing. On tablets and phones it just about makes sense, but on a desktop or laptop we still expect to install from DVD or via downloads. It's about feeling in control.

Perhaps because of this, Microsoft was wise enough not to make the Windows Store within Windows 8 the only method of software installation, but Redmond has certainly invested a lot of time and effort into making it an effective means of adding software to your system. Even if many people who use Windows 8 aren't aware it exists, it's surely shunned only by the most ignorant.

The reality is that app stores have hefty benefits for end users. For example, once you've bought an app it's always available for download. Should your hard disk go kaput or if you switch to a new computer, then reinstalling is just a matter of visiting the app store and clicking the Install button. No more hunting for installation disks or exploring websites. Then there's the fact that updates to the apps are automatically delivered via the app store too.

From a security viewpoint the app store learns from the dark past. Apps are manually inspected before they're made available, and usually a stipulation is that they must run in a sandboxed environment – a method of hiving off the app so it doesn't even know the rest of the system exists, so therefore can't hack it. Apps usually have to ask permission of the user to access hardware or software features, such as the webcam or even run in the background.

This week we take a look at a handful of gems in the Windows Store for Windows 8.1, and in coming weeks will look in-depth at the other app stores: Google Chrome OS, Apple Mac, and Linux.

Windows Store apps have a unique look and feel, usually designed to at least accommodate touch controls in addition to a mouse cursor. This might give the feel of patronising simplicity, but the fact is that there's a lot to enjoy and some surprising power user tools – as we show below. All the apps are free, too.

Notepad 8

The venerable Notepad app has been around since Windows counted in 16-bits but wasn't one of the apps selected to be converted into the new Metro-style interface (although its more sophisticated brethren WordPad received the honour – provided you're not using a Windows RT device, where it's inexplicably absent).

Enter Notepad 8, which brings basic text editing and viewing into the 20th century. It saves files in your Documents folder and – sacrilege – lets you add in bold, italics and different text colours. This is done by via the app toolbar, which appears at the bottom of the screen. However, you still can't change the font or do things like place pictures, so don't go getting any wild ideas. Pin Notepad 8 to your desktop taskbar and you've a cross-interface editor that's always available at a single click, regardless of whether you're working in the Metro environment or on the desktop.

Fresh Paint

Notepad 8 keeps things traditional but Fresh Paint takes the Paint app that's also been in Windows since the early days and brings it bang up to date. While we talk of brushes in the older app, in Fresh Paint you really do get to use watercolour and oil paint brushes, and what you apply to the canvas has the same properties as the real-life equivalents. Thus, oil paint has a faint texture to it, while watercolours can be applied several times in the same spot to increase the saturation. All tools are accessed by a pull-down palette at the top of the screen, and you also get pencil tools along with crayons.

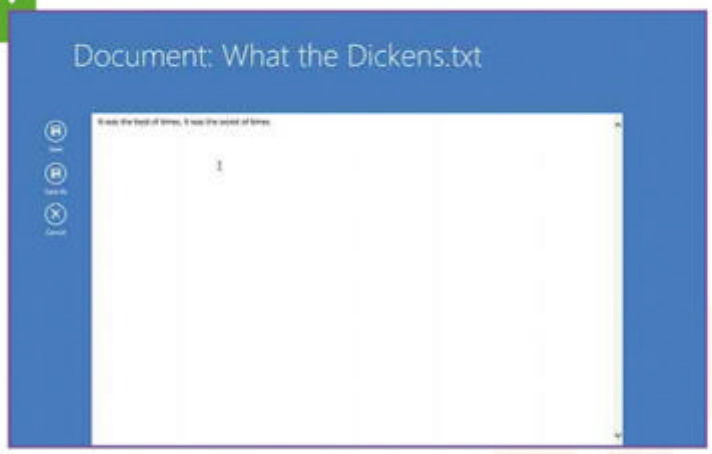
You can import your own pictures to paint over, and a lovely touch is the 'Inspire Me' feature that integrates with Bing to let you search the web for images before converting them to outlines or washed out colours in order to paint over. You can also purchase pictures from Disney and the like – ideal for kids who want to colour in.

This is a Microsoft app and a superb example of the kind of thing the resurgent software company is capable of nowadays.

Wikipedia

Other operating systems have embraced Wikipedia, particularly those from a certain fruit-themed manufacturer, but Microsoft remains strangely aloof. Coming to the rescue is this official app from Wikipedia, which primarily formats Wikipedia articles for viewing in a Metro-style app.

It opens to the same Featured headings that you see on the front page



Notepad 8 brings the venerable Notepad app into the 21st century, but still keeps things simple

Imagine the old Paint app with real life brushes, pencils and crayons, and you have Fresh Paint – and it's loads of fun too

of Wikipedia, such as Featured Articles, Featured Pictures and On This Day. A search field at the top right lets you quickly find what you're looking for. Open an article and you'll be shown columns of text (three on our laptop screen), and each section heading has an Edit button alongside. We assume this should provide the ability to edit – a key feature of Wikipedia, after all – but it didn't do anything on our test setup. Clicking the minus icon at the bottom right reduces the page to a series of headers, allowing quick browsing.

Bring up the app toolbar and you can instantly switch to viewing the article in a different language, open it in a browser or pin it to the app's home screen for quick access in future should you require it. The usual Windows 8 sharing tools mean you can also instantly pass the article's contents to an email or message.

Missing are tools to alter the text size or style, which is odd, but for stylish and fuss-free browsing of Wikipedia this app is certainly worth installing.

Book Bazaar Reader

eBook readers are nothing new and Book Bazaar Reader's features are, on the surface, pretty ordinary. It lets you read ePub, PDF, HTML and text files, for example, and involves niceties such as the ability to add bookmarks and highlight text while reading (the latter achieved by clicking and holding the page). You can vary the font and the page colour (including switching to a night setting), and use speech synthesis to read the book automatically (via the built-in Windows 8 voices). The app toolbar provides access to a search tool, as well as the ability to temporarily zoom into the text.

Where Book Bazaar Reader proves its mettle, however, is accessing online catalogues of free eBooks. You can tune straight into Gutenberg, for example, and not only search for books but download them direct into your library and start reading within seconds. We didn't count the number of book sources but they were certainly into the double digits and, of course, you can import any file you download manually too.

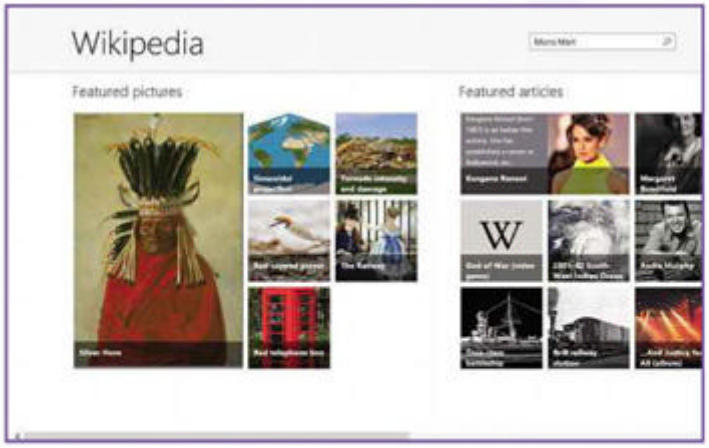
The app is free but supported by adverts practically everywhere. Crucially, these don't appear when you're reading an eBook. If they really irk you then $5 will get rid of them for a year, while $10 will lose them forever.

There can be little doubt that apps like Amazon Kindle, also available for Windows 8, provide a smoother reading experience, but for the ability to explore literary classics as well as contemporary material on sites like Smashwords, Book Bazaar Reader comes strongly recommended.

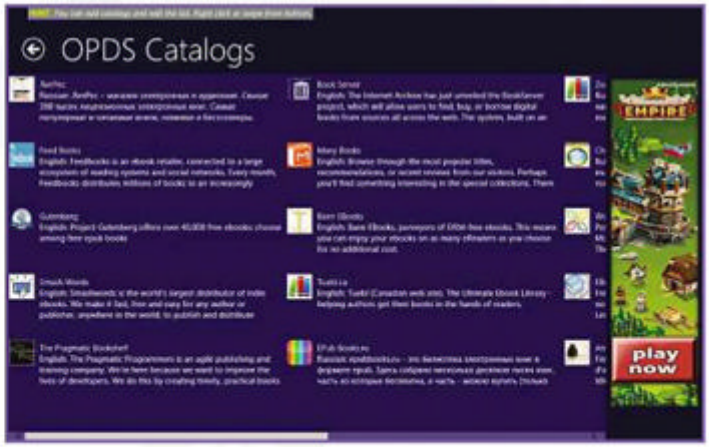
Toolbox For Windows 8

When an app ecosystem is essentially bolted onto a desktop OS there's always a risk that software developers will merely mimic existing software, rather than innovate within the freedoms offered by a new platform. Toolbox for Windows 8 definitely takes the latter route, and is unlike anything we've seen before. Even

The official Wikipedia app is a little basic but provides a stylish reading experience if you want to avoid a web browser



Book Bazaar Reader lets you browse several online catalogues of classic books, and is a terrific eBook reader to boot



explaining it is a little tricky, but we'll give it a go: it's essentially 15 mini-apps in one, and you can run up to six of them simultaneously on screen at the same time in a grid arrangement (which is similar to Windows 8's own Snap feature).

The apps include a simple paint tool, Twitter and Facebook clients, a calendar, a task manager, a stopwatch, a calculator, web browser, RSS news reader and more besides. You might choose to make voice notes while researching on a particular website, for example or update your task list while seeing what days you're free via the calendar.

None of this would be worth much if the app wasn't well designed or easy to use, and Toolbox ticks those boxes too. The boundaries between each mini-app can be resized by clicking and dragging, and bringing up the app toolbar shows several readymade grid layouts that you can choose.

Alas, part of the screen is obscured by an advert and $3 is required to remove it. This might be worth a punt if you find Toolbox useful.

Binder

Software for Windows tends to come into existence organically. For example, when PDF was invented there was the need for a viewer app. Therefore, PDF readers were created. It never occurred to the developers to do more than offer a reader app, because they were simply responding to a need.

The beauty of the smartphone and tablet revolution is that software developers can look at things afresh, and that's how we end up with beautiful apps like Binder. In the old language, Binder is a document viewer and organiser. That's almost an insult to the utility it offers, though, which is to compile your study materials into collections and allow you to annotate on them in various ways (everything from highlighting passages to drawing on the page).

Again, none of this is new – many eBook readers have similar features to these – but in the world of tablets and mobile it's all about how useful an app can be. This app syncs in the cloud automatically, for example, so you can access your documents at the Binder website or on another device on which you install the app (and it's available for most platforms).

The app is free and without adverts too, although it's apparently part of a learning software suite that encourages you to purchase study materials. You simply wouldn't know this unless you look for it, though, and for anybody who's involved in learning or simply has a lot of documents to manage on similar themes should consider Binder a mandatory installation.

"The beauty of the smartphone and tablet revolution is that software developers can look at things afresh, and that's how we end up with beautiful apps like Binder"

Simply.Write

Creative writing has never been as popular and it seems everybody is writing a novel nowadays. Simply.Write is typical of a new breed of word processors that aim to help the creative process by removing all distractions, and showing only a blank page – just like a typewriter. They also trim out intrusive features so that you're not having to wrestle with an over-attentive autocorrect, for example. In fact, there's only two controls within Simply.Write and they affect what you see – you can alter the font size, and the width of the text box into which you type. Both are altered via the Settings charm.

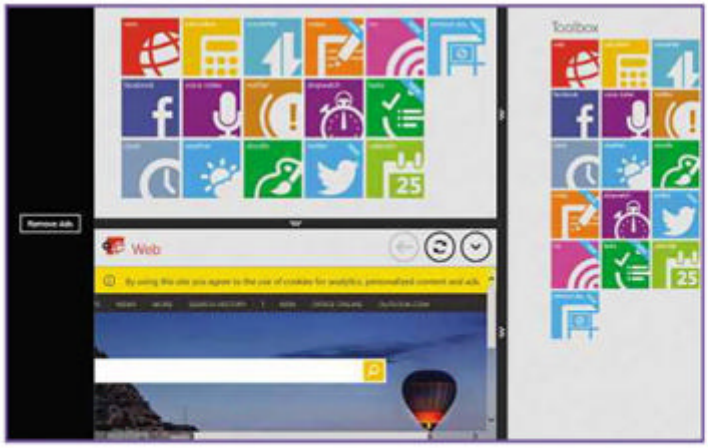
Whatever you choose means little to the eventual document, because Simply.Write can only output plain text documents. The styling of your document will have to come later via a dedicated word processor or layout app. Bringing up the app toolbar lets you save and open documents, but here Simply.Write will also show messages of encouragement at the top of the screen to keep you going.

There's not much more we can say about this app but that's kinda the point, and if you truly want a typewriter-like experience then it comes recommended.

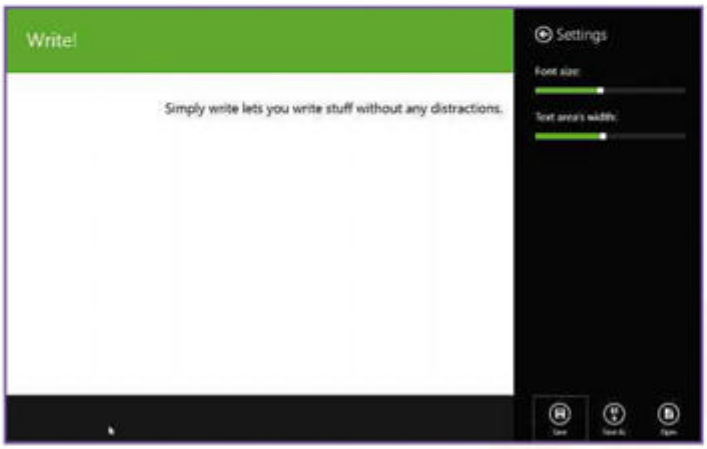
Data Usage

A knee-jerk reaction by hardened PC users is that all apps are necessarily simplistic. This is half true. The app interface is certainly simple compared to days of old, but the app itself can be as sophisticated or complex as it needs to be. Data Usage is an excellent example. Once installed it asks for permissions to run in the background, where it monitors data input and output. In the app itself you can set a billing date and monthly data allowance,

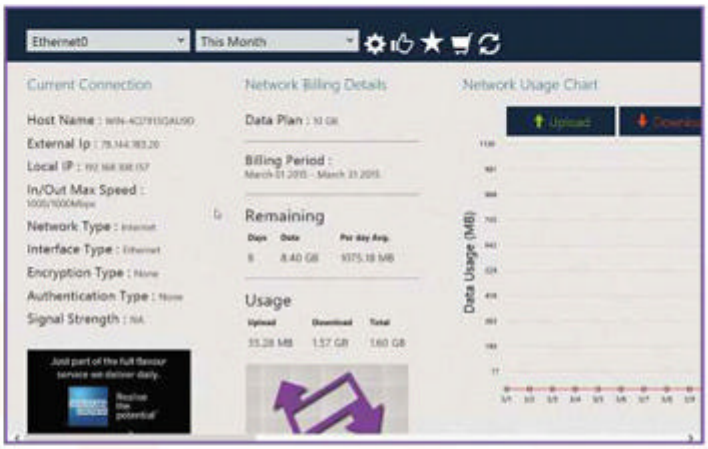
Toolbox for Windows 8 lets you mix and match mini-apps in order to boost your productivity



Binder lets you organise your documents to help with study or learning; you can also annotate and mark-up too



Simply.Write is a distraction-free editor ideal for those engaged in the creative writing process



Keeping an eye on your monthly data allowance is easy with the Data Usage app

and remaining data for the period is shown in a table along with at-a-glance daily figures. Total upload and download for the period is also shown on a line graph, plotted day by day, and you can also view a pie chart in order to quickly access uploaded vs downloaded data. Data can be exported for use in other apps or perhaps to sent to your ISP to show that you didn't after all exceed your allotted allowance this month. You can track all the interfaces of your device separately, so can track wi-fi independently of Ethernet if you need to.

The concept of apps acting as a dashboard is perhaps one that's underexploited, but again shows the unique utility of apps to fit into a desktop user's daily life.

Terminal RT

As its name suggests, Terminal RT is a fully functional SSH client – finally, no more need to use PuTTY! – that runs as a Windows 8 Metro-style app. Running full screen, as apps do, really does provide an authentic terminal-like experience – but other than this Terminal RT is as basic yet functional as is required.

You can create multiple server profiles (both Telnet and SSH), which can be accessed concurrently, and authentication can be via password or private key file. Text size can be modified via the app toolbar (large or small), but that's about all we can find to say about this app. It does what it says on the tin, and does it well. It's supported by always visible banner ads but these can be removed for £2.49.

TouchMail

With the new interface guidelines enforced by apps, developers have been forced to think creatively about how they go about their business, and TouchMail is an example of what can happen. In terms of basic functions this is an email app like any other – you can receive, view and send mails. However, each message is shown as a tile, in a similar manner to Windows 8's own Start tile system.

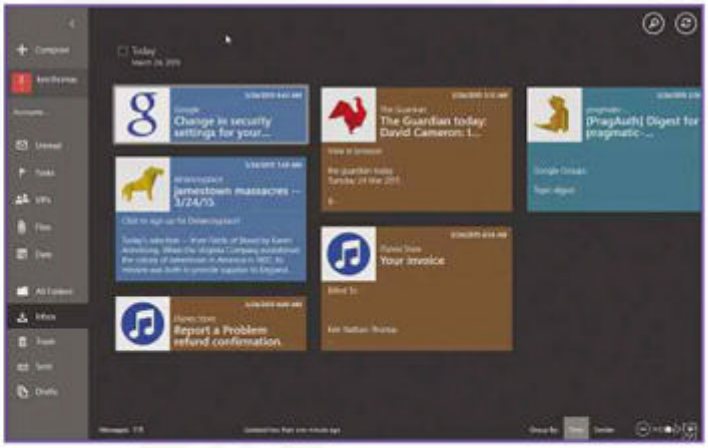
A zoom button at the bottom lets you enlarge or shrink the tiles and larger tiles shown excerpts from the messages, while smaller tiles are thumbnails that let you spot patterns – you can see instantly how many times a particular person or organisation has emailed you recently. Viewing or composing an email causes a window to slide in from the right of the screen, and emails can be deleted or archived by dragging them up and down.

Although designed for a touch interface, as the app's name suggests, it nonetheless works extremely well with a mouse as well. For those who have touchscreen devices that they also use with a pointing device then it offers the best of both worlds.

TouchMail really is a clever app that rethinks how we deal with email by exploiting the interface's strong points. **mm**

Apps need not be all about simple tasks, and Terminal RT lets you SSH or Telnet into a remote server

TouchMail reimagines the email inbox as a series of tiles, similar to Windows 8's Live Tile system



Remembering...
MSI Mega PC (Mega 651)

David Hayward recalls the first proper media centre PC

The early part of the new millennium was something of a golden era for the desktop PC. We had Voodoo Banshee cards delivering never before seen 3D effects in PC games. And PC cases were also changing from the previously conventional toilet-coloured aesthetics and adding a splash of creativity – even the first use of LEDs and transparent sided chassis.

However, there was something that was starting to happen in the world of the PC. It began to cross over the lines of home entertainment and enter the territories once inhabited exclusively by music systems and video players. Here, the beginnings of the media centre were born.

The transition wasn't always that successful, though, with the major bugbear being the noise generated by the PC itself. But MSI came up with a clever barebone solution that married the PC and audio system with a set-top box: The Mega PC.

Its History

The MSI Mega PC (aka the Mega 651) started life in mid-2003 or thereabouts. It had a cube-sized case, much like as those produced by Shuttle – but with some radical differences.

One obvious one was the fact that it looked more like a mini-HiFi system rather than a PC. MSI's design teams had quite the field day when coming up with the specifications for the look and functionality of the unit, and it certainly shows.

There were two modes that MSI incorporated into the Mega PC. The first was the dedicated audio HiFi mode, which used a separate button in the upper left of the unit. Once pressed, this lit up the large graphic equaliser and information LCD at the front of the PC. In this mode you could play CDs and listen to the radio via an FM tuner in the PC (which was an optional extra). Also, you could use the audio mode to read standard music CDs or your own burnt CDs filled with MP3 files.

The PC mode operated as you would expect and could deal with whatever media you had installed on your system through the more traditional codec methods. Thankfully, there was enough expansion in the case to fit a decent AGP card, and there was also USB, S/PDIF and even a card reader located either on the rear of the machine or under a hidden aluminium flap in the front.

It all sounded quite marvellous, but in reality the system often overheated, the LCD at the front stopped working, and the entire setup was more expensive than other cube desktops available at that time. As a result, the Mega PC didn't last all that long and was soon replaced with the Mega 865 before being sent to the PC graveyard forever.

The Good

The world's first true, working media centre. And it looked quite snazzy as well.

The Bad

It overheated, the remote that came supplied was a bit naff, and the LCD at the front panel would cease to work after just a month or so.

Conclusion

MSI had a great idea on its hands, and for some it worked a treat. But PC technology moved on, and before long we didn't need a system that looked like a normal HiFi. **mm**

The MSI Mega PC, the orange look was replaced with later models

It was a decent machine, but did get a little too hot under the case

Did You Know...

- Mega originally stood for MSI Entertainment and Gaming Appliance.
- It featured a Bluebird VL+ chip that could potentially read media from the hard drive, USB or flash cards.
- It even had a built-in modem.
- The outside of the case got very hot, especially after an hour so of use with a decent AGP card installed.
- A TV tuner card was also an optional extra, although we never managed to get it working in our part of the world.

The Things That Frustrate Us About... Keyboards

Yeah, we use them all day every day without really thinking about them, but when we do? Grrr!

The layout of a QWERTY keyboard was designed in 1868, and hasn't changed very much since. Though the machine the keyboard attaches to has altered radically, the mechanism of entering words really hasn't. To be fair, though, once you've learned to use a keyboard, you don't really have to think about it much ever again.

Whether you're a proper touch typist or have just kind of developed your own way of hitting the keys you want as quickly as possible, chances are your life involves tapping away on a keyboard for hours on end every day. Familiarity breeds contempt, though, as they say, – so let's have a moan about all the things we don't like about our trusty keyboards.

Why? Useless Keys

For most of us, there are only a few keys on a standard keyboard that we actually use: letters, numbers, the space bar, the Shift key, and the Return key, plus a few punctuation marks. The rest might as well not exist. When, for example, was the last time you deliberately toggled the Num Lock key on and off? It's useless on any keyboard that has arrow keys. The Caps Lock key doesn't really serve much of a purpose most of the time, either. I just had to Google what the AltGr key even does, because I don't think I've ever hit it except by accident. While we're at it, why are there two Windows keys and two Control keys?

Fix it: The number of keys you'll never use depends on the design of your keyboard – I never use the media keys on mine, for instance – but short of prying them off with pliers, you just have to ignore them, and try to type accurately enough that you don't hit useless things like Caps Lock halfway through entering a password or something.

Bleurgh! Germs Everywhere

When you think about it or look closely, keyboards are pretty gross. Too many of us eat at our desks and get crumbs in there, but even without food keyboards get full of dead skin cells and oils from our fingers and other really disgusting things. It's pretty grim.

Fix it: The obvious solution here is to clean your keyboard, which is easier said than done. Still, it's worth doing, so if you can't remember the last time you gave yours a good dusting, go and do it now – even if you don't take all the keys off and disinfect them thoroughly, a quick wipe over with a damp cloth wouldn't go amiss.

Ow! RSI Issues

This goes beyond annoyance, really, and into health problems. If you spend too long typing or in an awkward position, you can do yourself some serious damage – to your wrists, to your shoulders, and to your back, for starters. Ouch.

Fix it: Make sure your desk is set up as ergonomically as possible and take regular breaks! That's probably the most important thing most of us don't do, but make sure you're not slumped over your keyboard for hours on end. You're not gonna be any more productive for it, so get up, move around, and get a cup of tea. It's good for your eyes to get away from the screen every hour or so too. **mm**

Plug & Play: Linux Win

Is Linux the last true plug and play system?

David Hayward has been using Linux since Red Hat 2.0 in schools, businesses and at home, which either makes him very knowledgeable or a glutton for extreme punishment

Toying around with the Spectrum the other day made me think of how much technology has moved on in the last 30-odd years. The PCs, tablets, phones and ridiculously small music players of today are many times more powerful than anything we were using back in my early teens.

The modern 'system', be that the hardware or software, is an amazing, complex and incredible piece of technology. So why don't they just work out of the box?

I'll give you a few examples of what I mean. After playing with the Spectrum, I blew the dust off the PS3 and powered it up, controller in hand and game ready to be inserted. After the initial booting, it declared that an update was needed. After the update it rebooted, and I inserted the game, which also declared that it needed an update, which took an age. Then after the game rebooted, it decided that another update was also needed. After about 20 minutes, I actually managed to play the game.

I also tried a spot of gaming on my PC, with a fairly recent Steam title. After double-clicking Steam, it needed an update, then a relaunch, then another update and relaunch. The game too needed over 3GB of updates – more space than the original game took up on the hard drive.

Finally, I gave up on gaming and powered up a particular set-top box for the first time. After an update, configure, sign in, update, more configuring, two reboots and another third-party account that needed my credit card number before it would allow me to go any further, I decided that perhaps technology is a bit too clever for its own good.

However, when I recently took a flavour of Mint around to install on a friend's PC, it booted in Live mode, got on to the internet and worked. Sure, it said it needed an update or two, but it didn't stop me from using it. And out of the box, as it were, I had everything I needed to do all the usual sort of stuff I would normally do on a PC – work, play, browse etc.

So it got me thinking, is Linux is the last and only true plug and play system in development today? It works form the word go, it can automatically pick up 99% of all the available hardware out there, it has a full office suite, video player, music player, a smattering of games and all the tools needed to get on the internet, as well as browsing your local network resources. And it doesn't stop you from using it even when a major update is being applied.

Naturally, there are different distros that do things differently, but most will boot you into a pleasing and effective environment in which to use the system without spending hours installing more third-party products.

Spectrum Linux?

So perhaps instead of launching the Vega thing, Sir Clive, if he has the means, should bring out the ZX Spectrum: Next Gen, complete with a custom Linux installation that just works as soon as you plug it in. Now there's an idea…

Wasn't technology supposed to become easier in the future? Isn't that what we were told 30 years ago? If so, then there's no argument over who's winning the battle of desktop technology. Linux, it would seem, has already won.

When was the last time you had a system that just worked as soon as you powered it on?

Amiga 30th

Sven Harvey takes a look at the Kickstarter for the American event

As you are probably more than aware, 2015 marks the 30th anniversary of the unveiling and release of the original Commodore Amiga computer (which we now refer to as the Amiga 1000 or A1000.)

The anniversary is to be marked by the Amiga 30th Anniversary event at the Computer History Museum in Mountain View, California – itself only a few miles from the original Amiga, Inc. offices circa 1984, prior to the Commodore take over and fine creation of Commodore-Amiga, Inc.

The event will take the form of a banquet, as so often American events do. The venue will have a display of Amiga computers, from the original A1000 up to the current AmigaOne X1000 (and perhaps a prototype of the AmigaOne X5000) as well as the original publicly shown protoype of the Amiga (Lorraine) computer, with the main custom chips being on several circuit boards each!

Video segments of the evening will include footage from Viva Amiga! A panel discussion will be taking place involving some of the original Amiga development team; Carl Sassenrath, Dale Luck, Dave Needle and R J Mical. Other guest speakers are due to include Trevor Dickinson, founder of A-Eon Technology, which is developing AmigaOne hardware and bringing so much Amiga software up to date; Colin Proudfoot, former managing director of Commodore UK; and Mike Battilana, founder of Cloanto, which produces Amiga Forever.

Tickets for the banquet are being sold via Kickstarter to help fund the event, which also offers other incentives such as T-shirts and the like, and there's even an all-in package including an AmigaOne X-1000 computer system.

The organising committee is made up of some big Amiga market names, with Bill Borsari of NCAUG and CEO of Checkmark Events; Trevor Dickinson of A-Eon Technology; Luca Severini of the Computer History Museum; Paul Sadlick, who has worked on various Amiga publications; Kermit Woodall, formerly of Nova Design (ImageFX, Aladdin 4D etc.); Mike Battilana of Cloanto (Amiga Forever); and Evangelos Goulas formerly of EA, Sony Imageworks and 20th Centry Fox.

The Kickstarter can be found at **goo.gl/ZJRjik**, but be quick if you want to pledge, because by the time you re reading this, time will definitely be running out!

News Bytes

Swamp Defence 2

A new tower defence game is available for AmigaOS 4.1. Featuring 54 unlockable maps and nine bonus ones, the game allows you to control up to nine types of tower (actually represented by cartoon characters, all of which have improvements available from an in-game shop (using coins earned in-game), along with special weapons. However, each tower can only be upgraded twice in a single battle, requiring some strategy. Some weapons can be placed in the path of the bad guys, while other weapons can effect the whole map. Your courageous villagers fight to battle back the spawn of the swamp, near their village, where toxic fumes and a local nuclear power plant have created all manner of evil.

Available from Amistore as a download or on physical media via various retailers including the UK's AmigaKit, you can find out more over at the game's main web page: **goo.gl/N4SVs4**.

Lego Ideas

A rather cool little Lego rendition of the Amiga 500 (actually it looks more like an A1200, to be fair), which features little single-piece floppy disks and even the circuit board and chips, in a usual Lego-style fashion. Created by FBArts on the Lego Ideas website, the idea needs to gather a great deal of support to be considered for production. You can find out more at **goo.gl/cVOVJI**.

Sven Harvey has been our Amiga specialist for over 15 years drawing on his 24 years retailing computer and video games (25 Christmases, no less) and even longer writing about them.

Amiga

Playing With A Full Deckard?

Does the Nexus 6 live up to the hype, and how will it fare in 2015? Ian McGurren checks it out

The Nexus line holds a bit of strange place in the mobile world. Essentially Google's idea of what Android devices should be – a reference device, if you like – they have gone from tech-head secret to yearly contenders, at least in terms of power. They've not quite captured the public's imagination in the same way as the Samsung behemoths have, but Google's vast coffers have allowed the devices to be released at very reasonable prices. The Nexus 5 was possibly the closest the line has come to the top, coming out at a shade under £270, undercutting every other high-end device in one swoop. There are, therefore, high hopes for its sequel, the numerically christened Nexus 6. Is it able to replicate the success of the 5, or has Google dropped a big dud?

It comes as no surprise to find that, like the 4.7" Nexus 4 and the 5" Nexus 5, the Nexus 6 comes in at (roughly) six inches. While phones have been getting ever bigger, the upper end has settled around 5.5" - 5.7", so the 6" (well, 5.97") size of the Nexus 6 still looks large. However, judicious design can often offset such sizes, and the Nexus 6 is certainly no slab, with a convex, tapering rear that fits the hand well. Unfortunately, this is still not quite enough to disguise the bulk; this is strictly a two-handed device. Unable to fully wrap a hand round the device, this issue is also compounded by lack of grip on the rear.

In terms of hardware, however, the Nexus 6 brings its A-game to the table. The quad-core 2.7GHz Snapdragon 805 / Adreno 420 SoC is married to a very healthy 3GB RAM – on paper more than enough to power the quad-HD 2560 x 1440 AMOLED screen. In practice, however, it's not quite such a straightforward story. One of the Nexus range's selling points is that they run the very latest version of Google's mobile OS, and in the Nexus 6 case it features version 5, Lollipop. It's one of Lollipop's selling points, the built-in encryption, that does the Nexus 6 something of a disservice, though. With it on, performance takes a noticeable hit, but without it you are not eligible for the official over-the-air updates. What's more, it isn't quite as easy as switching it on and off, instead requiring a full encryption and decryption of the device.

If you can take the size, there is no doubt that the Nexus 6's screen is a highlight of the device. Media, browsing and gaming are all a pleasure on the sharp screen. There's none of the oversaturation of Samsung's Super AMOLED range, and contrast remains superb. It does, however, suffer the classic AMOLED inability to display pure white, only a 'dirty' white. With the addition of excellent front speakers, the Nexus 6 may well be the one for you if you travel a great deal and don't want to lug a phone and tablet about.

But how will the Nexus 6 stack up against the class of 2015? The answer could be 'quite well'. There's not a bigger device freely available at present, and of the rest, very few are yet running the superb Lollipop. It has raw power to stand up to many of them, though some of the more unknown quantities such as the Galaxy S6 and LG's G4 may well edge it in a spec race. Until the inevitable Galaxy Note 5 arrives, the Nexus 6 is the big phone on the block. Don't expect HTC to rest on its laurels, though: while it isn't quite six inches, the forthcoming E9 will also be a big screen temptation.

So is the Nexus 6 worth your £400 or so? The headline here is the device's size; it's unavoidable in your considerations, and even if you feel it'll be fine, holding the device before purchase is a must. It's powerful, though somewhat curtailed, and it's not quite as free as previous Nexus devices, but you will get the latest Android version. If you can take the dimensions, the Nexus 6 is a device you won't be unhappy with. The Galaxy Note 4 represents a more refined alternative, though you'll need to find another £100 or so. It's big, it's decent value, and it's pretty much one of a kind, but if it ticks your boxes, the Nexus 6 is still a good device.

Ian is a professional IT analyst, a semi-professional writer and a pretty amateur electronic musician. He likes gadgetry and loves making gadgets do things they were never designed to do

Today's Chip Wrapper, Tomorrow's News?

Samsung's flexible phone rumours sent Andrew Unsworth on a half-remembered trip down memory lane

This week, my Twitter feed lit up with a few tweets about a rumoured flexible Samsung Galaxy S phone, with the Daily Mail predicting the seventh incarnation will be the one to bend to its users' iron will (**tinyurl.com/oy6puck**). Rumours of a properly bendy Samsung smartphone have abounded since the electronics giant first showed off a prototype a couple of years ago, as reported in The Telegraph (**tinyurl.com/avbkrlr**), and the prospect of a foldable phone is certainly appealing. You could put it in your pocket without having to worry about breaking it for a start, but all this talk of flexible screens reminds me of my time as a penniless student at the turn of millennium.

At this time, LCD monitors had hit the shops, but they were a far cry from the high-resolution, big-screen models of today. A typical display was around 14 or 15 inches and wasn't that far removed from a laptop's display, with ghosting seemingly coming as standard on the cheaper models. They were expensive too, with even the cheapest models costing many hundreds of pounds. At this point, plasma TVs were still selling for around £10,000 in Kendals and, if I remember correctly, we'd only just got a DVD player for home. I remember my family being amazed by the way you could pause and rewind a DVD without having the fuzzy bands you get when you do the same on a VHS tape.

Going back to the Samsung announcement, the reason it reminds me of being a student is because one of my lecturers said that LCD technology would become much cheaper and that researchers were already trying to work out how it could be used in future. He said researchers had already envisioned the use of LCD technology as something you could wrap or screw up like paper, with one obvious application being advertising. As LCD screens produced heat, another 'blue sky' application was its use in fast-food wrapping. Not only would the LCD screen be used for advertising, whether it's the fast-food shop's adverts or something else, it could keep the food warm for longer too.

I found the idea of reading today's news on my fish and chips as appealing as I found it impossible. Where would you store the battery? Wouldn't it be environmentally wasteful and potentially poisonous? As technology has developed, though, the idea of a foldable LCD screen seems ever more likely and more useful. I'd love to have a foldable LCD, internet-ready screen for travelling so I could use it as a map or simply watch a film at the top of Loughrigg Fell instead of enjoying the stunning natural scenery.

Back then, almost 15 years ago, people were already looking at what seemed like an understood, straightforward technology to see how it could be used differently in the future. I take my hat off to all those pioneering visionaries who think "Wouldn't be it be brilliant if we could make this do that" and then make it happen. As for a foldable Samsung phone, I look forward to seeing one, especially if I can wrap my chips in it on the way back from the pub.

Andrew Unsworth has been writing about technology for several years, he's handy with a spanner, and his handshaking skills are second to none

Ryan Lambie has loved videogames since he first stared up in awe at a *Galaxian* arcade cabinet in his local chip shop. 28 years on, Ryan writes about gaming for Micro Mart. He's still addicted to chips and still useless at *Galaxian*

Groove Is In The Heart

Toejam & Earl: Back In The Groove brings back a cult console hit from the 90s, while MMO Crowfall is another recent crowdfunding success story on Kickstarter

This week, Ryan takes a look at two of the latest successes on Kickstarter and checks out Atari's survival game based on its 1979 arcade hit Asteroids...

Plug & Play

If the advent of crowdfunding has taught us anything, it's that nostalgia is an incredibly powerful force in the games industry. Thanks to Kickstarter and sites like it, industry veterans like Peter Molyneux, David Braben and Tim Schafer have successfully launched their own independent projects – some, admittedly, with more success than others. David Braben's space trading game *Elite: Dangerous* successfully tapped into fond memories of the 80s original, while Molyneux's *Godus*, billed as a spiritual successor to the much-loved *Populous*, has been mired in controversy and disappointment.

While it's been suggested that the initial burst of interest in funding games through crowdfunding has been replaced, to a certain degree, by Steam Greenlight, some projects are still garnering plenty of interest – particularly when they tap into our nostalgia for games of the past.

Take, for example, *Toejam & Earl: Back In The Groove*. If you owned a Sega Mega Drive jhkgiin the 90s, you may remember *Toejam & Earl*, the Roguelike adventures of its alien duo, with its surreal humour and references to the era's hip hop culture. It was an acclaimed hit, and while its two sequels were less successful, the original retains a cult following.

Back In The Groove sees the original *Toejam & Earl*'s co-creator revive the 1991 game's dungeon-crawling gameplay, with hand-drawn, 2D characters roaming a 3D landscape. The new look is a bit of an acquired taste, but the project generated enough attention on Kickstarter to exceed its initial goal of $400,000; all told, *Back In The Groove* manage to pull in a healthy total of just over $508,000.

Toejam & Earl isn't the only Kickstarter success story to hit the headlines either. The fantasy MMO *Crowfall* is promoted as "*Game Of Thrones* meets *EVE Online*" and is headed up by J Todd Coleman and Gordon Walton, who together have worked on such games as *Shadowbane*, *Star Wars: Galaxies* and *Star Wars: The Old Republic*. With names like that behind it, it's little surprise that *Crowfall* not only managed to exceed its $800,000 goal but more than double it.

So while we may never see a crowdfunding phenomenon of the same magnitude as *Star Citizen* again – in March, its total soared past the $75m mark – sites like Kickstarter are still providing a viable means of support for developers with attention-grabbing projects.

Toejam & Earl: Back In The Groove is scheduled for release in November, while *Crowfall* is due to launch in 2016.

Online

Toejam & Earl is by no means the only game to return from the past in recent weeks. Atari is in the process of reviving its 1979 arcade hit *Asteroids* – as a sci-fi MMO. Called *Asteroids: Outpost*, it's an open-world sandbox game, in which you play a space miner eking out an existence in the middle of an asteroid belt.

"Players take the role of interstellar miners, staking, protecting and expanding their claims, while they mine for precious resources and fight off would-be claim jumpers," the game's executive producer Peter Banks recently told the website Read Retro. "These intrepid miners can craft, customize and upgrade their equipment, ally with friends and defend their territory as they grow their ever-expanding base of operations."

Atari is bringing out a range of new games based on its old hits. Its latest is Asteroids: Outpost, a sandbox survival game (very) loosely based on the 1979 arcade classic Asteroids

Asteroids: Outpost taps into the current popularity of survival games like *DayZ*, where resources are scarce and scavenging is an artform. Yes, you may be asking, but what about the *Asteroids*? What has all this got to do with the old Atari arcade machine? Well, *Asteroids: Outpost* will see your carefully built bases come under attack from meteor strikes from time to time, so you'll have to clamber into a gun turret and blast the evil rocks into atoms.

"Welcome to the new gold rush," the first trailer (**youtu.be/ZRXSI2duZGw**) says, as *Asteroids: Outpost* makes its debut on Steam Early Access. That trailer seems to point to what looks like a massive multiplayer shooter more than anything – its lean 50-second duration is devoted to a static shot of armoured soldiers shooting each other with huge sci-fi guns – though PvP blasting is clearly only a part of what developer Salty Games has in store.

Asteroids isn't the only game Atari is planning to dust off and revive either. "We are going to be teaming up with young and innovative studios to take a refreshing look at each game from our extensive portfolio," says Atari's COO Todd Shallbetter. "Releasing *Asteroids: Outpost* through the Early Access program will also help us get feedback from the community. *Asteroids* is the first of a long series of rebirths, and we are considering doing the same for our other iconic games such as *Warlords*, *Adventure*, *Tempest*, *Missile Command* and many more."

Elsewhere, Atari has a new *Alone In The Dark* game on the horizon – subtitled *Illumination* – this time imagined as a horror shooter with a four player co-op mode. Originally slated for release in 2014, *Alone In The Dark: Illumination* is now scheduled to come out sometime this year. *Asteroids: Outpost*, meanwhile, is set to remain in Early Access for "as long as needed."

"While we don't anticipate this to go on forever," Salty Games writes, "the launch product can be seen as a core game, with an ongoing stream of updates as close to monthly as possible.

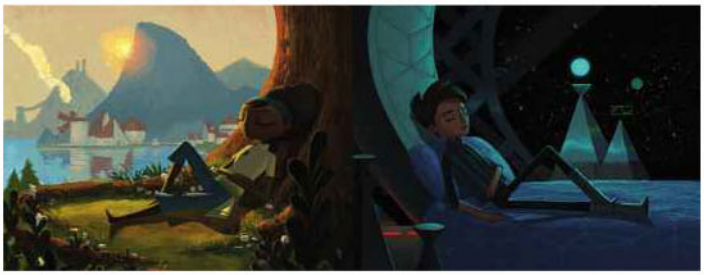
For Atari, it seems, the future lies in sprucing up familiar names from the past. Only time will tell whether it'll result in the new gold rush Atari is hoping for.

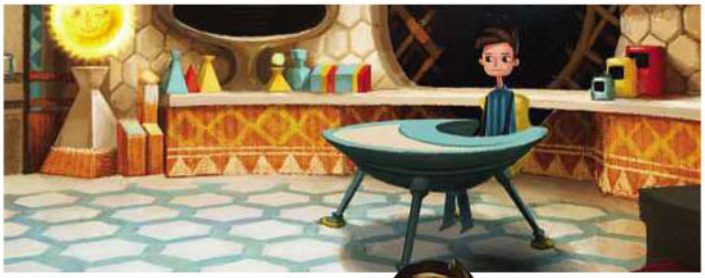
Incoming

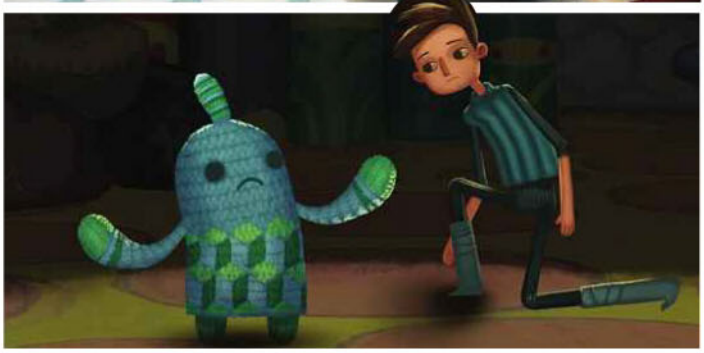
To return to the topic of Kickstarter once again, one of the platform's major success stories was Double Fine's *Broken Age*. Headed up by Tim Schafer, designer of such classics as *Monkey Island* and *Grim Fandango*, it's a return to the point-and-click genre that was once hugely popular in the 1990s. After a fairly lengthy delay, *Broken Age Act 1* appeared in 2014 and marked a welcome return for Schafer's trademark humour and sly puzzles.

Since then, we've been waiting to hear when *Act 2* would emerge, but finally, on 26th March, Schafer's studio Double Fine revealed that *Broken Age*'s second part will be out on 28th April. That's a bit later (a whole year to be precise) than the studio originally anticipated, but it's better late than never, we suppose.

In the meantime, Double Fine has released a documentary (**bit.ly/1F3uoNQ**) about the making of *Broken Age* on YouTube. Also funded by that 2012 Kickstarter campaign, it's a breezy – and at ten episodes, very in-depth – look at the making of this quirky adventure game.







Double Fine's Broken Age Act 2's been a long time coming, but the latest chapter in its point-and-click adventure opus is finally out on 28th April

AD INDEX

2/3 CCL

6/7 Morgan

11 GigaRefurb

12/13 PC Specialist

17 Falcon

99 CISCO

100 Microdream

To advertise contact Karl Taylor
t: +44 (0)20 7907 6706
e: Karl_Taylor@dennis.co.uk

NOTE TO ADVERTISERS

Micro Mart © Dennis Publishing, 30 Cleveland Street, London W1T 4JD. Company registered in England No 1138891. This publication may not be reproduced or transmitted in any form in whole or in part without the written consent of the publisher. Quotations for re-prints or other use of material are available on application.

THE BUSINESS ADVERTISEMENT DISCLOSURE ORDER 1977 (effective from 1st January 1978) requires all advertisements by people who seek to sell goods in the course of a business to make that fact clear. It is the responsibility of the advertiser to comply with the order. Lineage trade ads in Micro Mart carry this *T symbol. It is an offence for which you may be prosecuted not to advertise the fact that you are a trader.

MICRO MART is published weekly by Dennis Publishing. Subscriptions rates available on request. Micro Mart welcomes the submission of articles and reviews for publication. Please enclose a stamped self adressed envelope; otherwise the return of material cannot be guaranteed. Contributions accepted for publication by Dennis Publishing will be on an all-rights basis. Views or opinions expressed by freelance contributors are not necessarily those of Dennis Publishing. Advertisements and goods/services offered are the sole responsibility of the particular advertiser and Dennis Publishing cannot be held in any way responsible. Whilst every care is taken the publishers cannot be held legally responsible for any errors in articles or advertisements or any resulting unsatisfactory transactions. We will however investigate incidents on a written complaint. © Dennis Publishing 2006. This publication may not be reproduced in or transmitted in any form in whole or in part without the written consent of the publishers. ISSN 956-3881. Blimey.

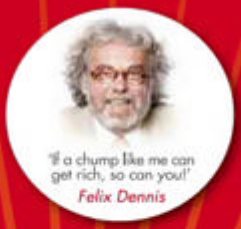
'THE BEST BOOK EVER WRITTEN ON HOW TO GET RICH'
J. Disorobo, Amazon.com

This is a book about getting rich.

It's different from any other book on the subject because Felix Dennis made himself rich.

Very rich indeed.

And now he's going to show you how to do it!

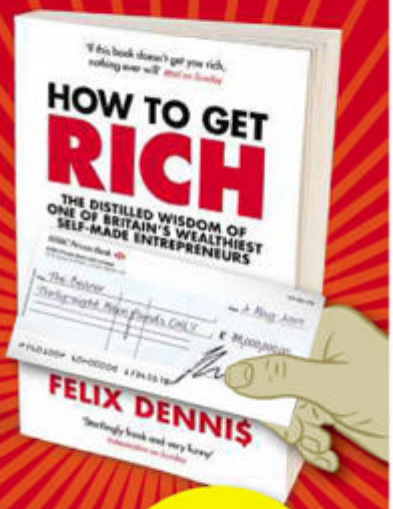


THE CRITICS

'If this book doesn't get you rich, nothing ever will'
Mail on Sunday

'Well-founded advice based on hard-won experience'
Financial Times

'Full of honest insights. I strongly recommend this book'
Sunday Telegraph



THE READERS

'An inspirational book'
Alan Bates, Amazon.co.uk

'Essential reading. A great work'
Tom Rubython, Amazon.co.uk

'A true masterpiece'
'The Wanderer', Amazon.com

PAPERBACK EDITION OUT NOW £7.99

AVAILABLE NOW AT BORDERS
AND ALL GOOD BOOKSTORES

EBURY PRESS
www.randomhouse.co.uk/howtogetrich
www.felixdennis.com

'WISE, FEARLESSLY FRANK AND TRULY INSPIRATIONAL'
Mail on Sunday

FREE Private Classified Adverts

1 ONLINE

Visit our website, register and submit your classified advert at www.micromart.co.uk

Your advert will not only appear in our magazine, but be live on our website too!

2 POST

Simply fill in the form & post to:

Emma Corbett, Micro Mart, 30 Cleveland Street, W1T 4JD ◀ **NEW ADDRESS!**

Step 1

Write the wording for your advert in the numbered boxes below (one word each box). Maximum 30 words free.
Please complete in BLOCK CAPITAL LETTERS, then proceed to Step 2

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25
26	27	28	29	30
31	32	33	34	35
36	37	38	39	40
41	42	43	44	45
46	47	48	49	50
51	52	53	54	55
56	57	58	59	60

30 Words FREE Private Ads Only (Trade ads MUST be boxed or reversed)	Boxed		Reversed	
	Private	Trade	Private	Trade
	£6.80	£13.60	£8.00	£16.00
£1.70	£8.50	£17.00	£9.70	£19.40
£3.40	£10.20	£20.40	£11.40	£22.80
£5.10	£11.90	£23.80	£13.10	£26.20
£6.80	£13.60	£27.20	£14.80	£29.60
£8.50	£15.30	£30.60	£16.50	£33.00
£10.20	£17.00	£34.00	£18.20	£36.40

Step 2

Choose a category you would like your advert to appear in and tick the box.

☐ Hardware for sale ☐ Software for sale ☐ General for sale ☐ Accessories

☐ Hardware wanted ☐ Software wanted ☐ General wanted

Step 3

Complete all fields of your personal details and payment method.

Name

Address

Post Code

Landline Telephone No. Email

If I have more than 30 words, I have enclosed due payment. I am not advertising pirated, pornographic or any other kind of illegal software and my advert is both honest and legitimate. MM reserves the right to refuse or alter adverts at the discretion of the management. MM cannot be held responsible for the condition or quality of goods advertised. Your advert will be processed on receipt and will appear a.s.a.p. subject to space and availability.

Please tick appropriately ☐ Private ☐ Trade

I enclose payment by ☐ Cheque ☐ Postal order

or please Debit my Mastercard/Visa/Amex account No

Expiry Date:

Authorise payment for £

3 FAX this completed form to: 0207 907 6066

Please Note: The standard Micro Mart conditions of advertising acceptance apply to all classified advertisements. Cancellations and amendments are not accepted to free ads. The publishers may refuse any advertisements and cannot guarantee insertion into any specific issue. Dennis Publishing will use your information for administration and analysis. We may share your information with carefully selected 3rd parties. We, or they, may send you details of other goods or services which may be of interest to you. The information may be provided by letter, telephone or other reasonable means of communication. If you do not want your details to be shared with carefully selected 3rd parties, please tick here. ☐

IT Essentials

TO ADVERTISE CALL
KARL TAYLOR

0207 907 6706

karl_taylor@dennis.co.uk

FILCO

The best keyboards in the world.
Available from
www.keyboardco.com
0845 205 5555

Today's news today, not a week later

- Breaking IT news
- News that matters to UK IT decision makers
- Updated throughout the day

ITPRO
FIT FOR BUSINESS

IT news as it happens, online now at
www.itpro.co.uk

www.bit-tech.net

THE LEADING DESTINATION FOR PC ENTHUSIASTS & HARDCORE GAMERS

bit-tech.net

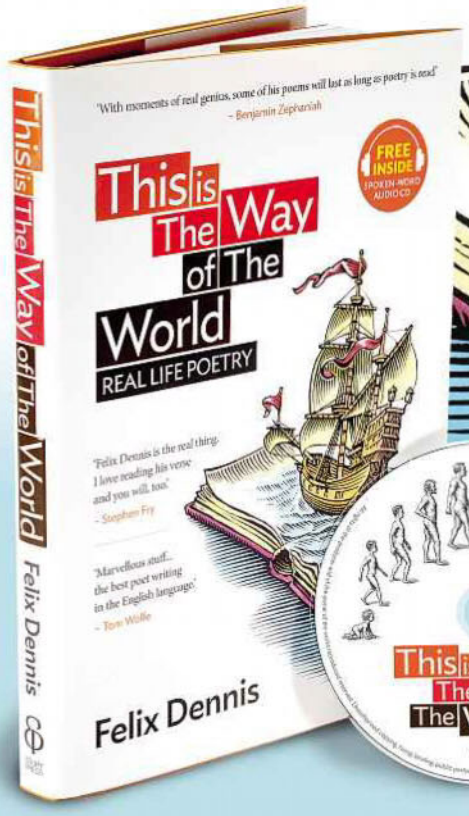
'With moments of real genius, some of his poems will last as long as poetry is read.'

– Benjamin Zephaniah

This is The Way of The World

Felix Dennis

RRP £12.99
AVAILABLE NOW FROM AMAZON AND ALL GOOD BOOKSELLERS



A book of poems for those who don't read poetry (as well as for those who do!)

A collection of 'real life' poems by Felix Dennis, one of Britain's best-loved poets, charting life's course from infant to endings with illustrations by Bill Sanderson.

www.felixdennis.com contains many poems, published and unpublished, as well as a library of sound recordings and video footage of Felix Dennis's verse and poetry tours.

EBURY PRESS

To place an ad in our classifieds, simply fill in the form at www.micromart.co.uk or send your ad by post to Maaya Mistry, Micro Mart, Dennis Publishing, 30 Cleveland Street, W1T 4JD

HARDWARE FOR SALE

Have you got any old kit lying around you'd like to get rid of? Fancy making a few pounds while you're at it? Why not advertise in the Micro Mart classifieds? It's easy and it's free, just email what you've got, how much you'd like for it, and your contact details to micromartclassifieds@gmail.com, and we'll do the rest. There are thousands of readers out there looking for components every week, and you may have something unwanted they've been searching for – so get in touch and save your kit from going to the tip!

ASUS P5QL-EPU Motherboard - 775 Socket - DDR2. Tested and removed from a working environment, comes with I/O Plate. £45 inc Free Courier. Payment via PayPal.
Email: info@jmcomputing.info

LAPTOP HARD DRIVE. 160GB SATA 2.5". WESTERN DIGITAL. Model: WD1600BEVT. Fully tested. Perfect working order. Partitioned and formatted NTFS. Free postage. Price £22. Paypal accepted.
Email: geofry@tiscali.co.uk

DESKTOP HARD DRIVE. 640GB Western Digital 3.5" SATA model WD6400AAKS. Perfect working order. Partitioned and formatted. Only used as back-up drive. Free delivery. Price: £33. PayPal accepted.
Email: geofry@tiscali.co.uk

Vintage Amstrad PC1512 HD20. Colour Monitor 20MB Hard Drive 5.25 Floppy Original Amstrad Disks Manuals spare Keyboard and Mouse. This is a rare fully functioning collectable. £60.
Tel: (01949) 876235
Email: hc4203@gmail.com

4x 1GB DDR2 Ram (OCZ Nvidia SLI PC2 6400 epp 4-4-4-15). £40.00 for all 4 + Post/Packing. Perfect working order.
Email: ken.toole1@virginmedia.com

Seagate Barraucda 250GB SATA Hard Drive 3.5". Tested and removed from a working environment. £12 inc Free Courier. Payment via PayPal.
Email: info@jmcomputing.info

Corsair Vengence 16GB (2x 8GB) DDR3 Memory CMSX16GX3M2A1600C10. Never used but box opened. Selling due to wrong voltage, these are 1.5V and I needed 1.35V. Asking £85.00 inc. postage to the UK.
Email: fabstock1@gmail.com

4x 1 GB DDR2 RAM (Ocz Nvidia SLI PC2 6400 epp 4-4-4-15) for Sale. £40.00 for all 4 + Post/Packing. In perfect working order.
Email: ken.toole1@virginmedia.com

HP Microserver n40l / windows 7 Pro / 4GB RAM / 400GB drive / MS Office 2003. This HP n40l Microserver is in excellent condition and comes with Windows 7 re-allocated, activated, & completely updated Feb 2015. Also installed is Minitools Partition Magic, MS Office 2003 HP basic, with codes/ coa's. Buyer may have Linux Mint, or a completely bare drive. 2 spare drive frames. I have the original packing as per HP original delivery. So far as I can see, this Microserver will take 16GB memory and up to five hard drives. See it working before buying, (by arrangement). No refund under any circumstances. Collect from Harrogate, North Yorkshire. £140. Cash on collection. Delivery might cost £8 via Hermes, maybe much more to Highlands/ Islands. Payment by Cheque O.K subject to clearing, Paypal at £25 additional. (to cover their fees).
Tel: (07794) 528857
Email it_central@ntlworld.com

Used Asus Wireless Router for sale. Dual-band 4 x GB Ethernet Wi-Fi RT-N66U N-900. £65.00 O.V.N.O. Selling cause I have no need for it since upgrade to BT Home Hub 5.
Email: beme12355@googlemail.com

SKY PLUS and SKY PLUS HD REMOTEs. Original £7.50 + P&P please email or call me for more information.
Tel: David (01616) 888119 Email: pcmadnessltd@yahoo.co.uk

Intel Core 2 Duo E4600 3GHz 775 Socket Processor. Tested and removed from a working environment. £10 inc Free Courier. Payment via PayPal.
Email: info@jmcomputing.info

2 x 2GB DDR3 1600 MHz RAM. Recently taken from a 2012 mac mini. As new £25.
Email amstereofan@gmail.com
XFX GeForce Nvidia 8800Gts Graphics Card for Sale. £40.00 + Post/Packing. Perfect working order.
Email: ken.toole1@virginmedia.com

XFX GeForce Nvidia 8800Gts Graphics Card For Sale. £40.00 + Post. In perfect working order
Email: ken.toole1@virginmedia.com

Custom Built modified watercooled gaming desktop. i5 4670K, R9 280X, Silverstone RV-01 USB3, 1000W PSU: parachord sleeving, Z87M OC Formula, 8GB Kingston Fury 1866MHz, 180mm and 120mm Radiator. Numerous mods, Yellow and Black colour scheme! No Storage. Email for pics and info. Buyer collect: Gloucestershire. £800 ono.*Tel: Adam (07426) 874117 Email: flaming_monkey95@hotmail.co.uk*

Asus A8V motherboard, socket 939. Clips holding CPU cooler broke, CPU overheated & shut down. M/B should be OK and there is 4GB of ram on board. Free, collect only. North Wales.
Tel: (01286) 678584
Email: gw7hav@googlemail.com

Kingston HyperX 2x2GB DDR2 1066MHz RAM. Tested and removed from a working environment. £45 inc Free Courier. Payment via PayPal.
Email: info@jmcomputing.info

CPU sale. Intel Core 2 Duo E4400 2.0GHz £10, Intel Pentium 4 630 3.0GHz £7, Intel Celeron M 350 1.3GHz £5, Intel Celeron Mobile Dual core T1500 1.866Ghz £6, Intel Pentium 4 630 HT 3.0Ghz 2MB cache £8, AMD Athlon 64 3200 £5 Athlon 64 3500 £6 Athlon 64 3200 Dual core £10 postage £2.
Tel: Jeremy Gill (02089) 430683
Email: arthur.pewty1@virgin.net

2 x 512MB PC3200 DDR400. These two sticks were removed from my working system, now redundant. £5, plus £1 P&P.
Tel: Alan (02084) 202322
Email: alan@asandco.co.uk

DDR2 memory sale. 2 x Nanua PC2 3700 256MB £6 pair, 2 x HP PC2 4200 256MB £7 pair, 4 x HP PC2 4200 512MB £10 pair or £18 for four.
Tel: Jeremy Gill (02089) 430683
Email: arthur.pewty1@virgin.net

Asus M2N2-SLI Deluxe motherboard bundle. With AMD Athlon 64 4000 CPU, 4Gb Corsair ram, fan, backplate, manual, driver CD. £40
Email: david.white38@ntlworld.com

IBM/LENOVO SFF BASEUNIT. P4/ 2.8 H-T, 2GB RAM, 40GB Hard Drive, CD-Rom, 10/100 Network, sound, USB, Clean install XP-pro, fully updated, Office Suite, Anti-Virus, & all usual utilities, COA Licence Sticker & Install media, £25
Tel: Pat (07710) 348638
Email: pat4cars@aol.com

FUJITSU-SIEMENS MINITOWER. Pentium D 2.8 Dual-Core, 2GB RAM, 80GB Hard Drive, DVD-RW, Gigabit network, sound, Clean Install XP-pro, fully updated, Office suite, Anti-Virus & all usual Utilities, Legal COA sticker & System Image. £35
Tel: Pat (07710) 348638
Email: pat4cars@aol.com

DELL OPTIPLEX GX240 SFF. P4/1.6, 20GB hard Drive, 768MB

RAM, CD-Rom, 10/100 network, Sound, Front USB, Clean install XP-pro, fully updated, works OK but slow by modern standards, £15.
Tel: Pat (07710) 348638
Email: pat4cars@aol.com

LG Flatron W2246S 22" monitor with power and VGA leads. No dead pixels in very good condition. £50 Buyer Collects (Verwood, Dorset)
Tel: (01202) 826057 Email: geoffandcynth@themailspot.com

2x 1GB PC2100-648. These two matched sticks were removed from one of my redundant systems. Plus one PC2700 (DDR 333Mhz) and one 512Mb PC3200 DDR400 stick. All for £5 plus £2 P&P.
Tel: Alan (02084) 202322
Email: alan@asandco.co.uk

Laptop DDR2 memory sale. 2 Corsair Value Select 533mhz 1GB £18 pair, 2 Hynix 800mhz 2GB £26 pair, 2 Generic 533mhz 1GB £15 pair,1 Generic 800mhz 1GB £10,1 Nanua 666mhz 1GB £, 1 Samsung 666mhz 1GB £8. Postage included
Tel: Jeremy Gill (02089) 430683
Email: arthur.pewty1@virgin.net

Two 120GB Maxtor DiamondPlus 9 Drives plus one 80GB DiamondPlus 10. Can be supplied with two plug-in caddies. No reasonable offer refused.
Tel: Alan (02084) 202322
Email: alan@asandco.co.uk

HP Elitebook 8760w i7 2820QM @ 2.2GHz 32GB RAM 750GB HDD Quadro 4000M GPU. Only 2 small marks on whole machine. Cost £3500 when new. £900 ONO
Tel: (07772) 926632
Email: stedaley19@gmail.com

WD 2TB desktop hard disk. Formatted ready for an OS. Runs very nicely. New laptop means my desktop items must go! £40 includes free tracked postage.
Tel: (01619) 501218
Email: jmbest2@sky.com

Toshiba C500D-B-11 laptop. Virtually new cost £279 will accept *£150 O.N.O.*
Tel: (01217) 535324

Intel 3930K processor. Used, but not overclocked. No box or fan. £220 ono. Will ship to UK address.
Tel: Tim (01623) 624509 Email tim.stirland@btinternet.com.

Amstrad PcW 9256 in good working order with software. Offers.
Tel: John Adams (02088) 641202
Email: meeching@uwclub.net

Asus P8Z68-v LX socket 1155 motherboard. Original box 1/0 cover user guide driver disk fitted core i3 2100 CPU 3-1GHz and 8GB PC1300 memory. No fan. Working fast and fine. £125 + free postage.
Tel: (01619) 501218
Email: jmbest2@sky.com

ASUS P5B Motherboard - 775 Socket - DDR2. Tested and removed from a working environment, comes with I/O Plate. £35 inc Free Courier. Payment via PayPal.
Email: info@jmcomputing.info

SAMSUNG GALAXY Tab 3 for sale. 2mths old, 8GB, wi-fi, £80 open to offers. Willing to post at a charge.
Tel: Christine (01386) 831836

SoundBlaster Audigy SE 7.1 soundcard for sale. Perfect working order. Selling due to not being needed any more. Just £12 plus postage.
Tel: Ian (01132) 629028
Email: ianmatthewuk@yahoo.co.uk

Asus p8h61-mle motherboard socket 1155. Original box 1/0 cover driver disk manual together with Celeron 91620 dual core CPU and 4 9195 pc1300 memory. Working fine. No fan. £70 + free postage.
Tel: (01619) 501218
Email: jmbest2@sky.com

Toshiba Satellite SA60 laptop. Model PSA60E-092058EN. Windows XP Home Edition with Certificate of Authenticity. For spares or repair - broken power connector on mobo. No power cord. Otherwise in very good condition. £40.00 + p&p
Tel: Peter Scarth (01452) 372350
Email: pscarth@blueyonder.co.uk

Apple Touch 32 GB iPod. Virtually new cost £199 will a ccept £100 O.N.O
Tel: (01217) 535324

400GB IDE drive 3.5 inch formatted ready for use. Only £20 plus £3 for p&p. I can load genuine XP Professional from Microsoft with genuine certificate of authenticity for an extra £10. Refurbished.
Tel: Dave Thomas (07828) 982930 or (01942) 706571
Email: davethomas96@aol.com

Amstrad PcW 9256 in good working condition with software. Offers.
Tel: John Adams (02088) 641202
Email: meeching@uwclub.net

Panasonic KX-P7105 mono laser duplex printer. Some toner left. Up to XP only – hence £25. Buyer collects from N2, East Finchley
Tel: (02083) 431527
Email: pnnikiel@gmail.com

Amstrad PcW 9256 in good working condition w/ software. Offers.
Tel: John Adams (02088) 641202
Email: meeching@uwclub.net

GEFORCE 1GBYTE 24- PCI express PC card. HDMI DVI VGA PC video card. £10 plus p&p £4.50. 2 for sale. £10 each.
Tel: (01707) 339063
Email: awhishaw@aol.com
HP 4GB memory Microserver with two hard disc drives. £110. One with Linux MINT. Other with Linux FreeNAS. This will also run Windows 7 and Windows Server or Home Server. (Win 8 I've not tried it) Two spare HD slots with appropriate caddies. Slot for your SATA DVD drive also, (or use external usb or DVD drive if needed. four usb sockets on front, two on rear. VGA, network, power sockets on rear. Supplied in original HP box with CD and leaflets etc.
Collect from Harrogate, North Yorks, or posted via Hermes for £12 (or less if I can do it cheaper). Cash on inspection and collection (Highlands and Islands might obviously cost more to be delivered).
Tel: (01423) 872045
Email: it_central@ntlworld.com

400GB IDE drive 3.5 inch formatted ready for use. Only £20 plus £3 for p&p. I can load genuine XP Professional from Microsoft with genuine certificate of authenticity for an extra £10. Refurbished.
Tel: Dave Thomas (07828) 982930 or (01942) 706571
Email: davethomas96@aol.com

EPSON PRINTERS T715 12 multipack F.O.C. to good home, just pay postage £2.50. (Tesco equivalent original cartridges £120 current special offer!) Perfect crisp printing etc.
Tel: Pete Dew: (07526) 988594

EPSON PRINTERS T711 6 multipack F.O.C., just pay postage £2. Perfect crisp printing etc. May have others F.O.C. if model older than 12 months.
Tel: Pete Dew (07526) 988594

Lexmark Printer Z601, still working and in good condition, £25.
Tel: (01386) 832758

Intel 3930K processor. Used, but not overclocked. No box or fan. £220 ono. Will ship to UK address.
Tel: Tim (01623) 624509
Email tim.stirland@btinternet.com.

Apple Mac G4 Tower. 400MHZ cpu, 640MB Ram, 2xHardDrive 40GB,20GB. DVD & ZIP Drive. OS X v10.3 Panther+OS9. NO KEYBOARD OR MOUSE. £25 ono Buyer collects
Tel: (07941) 254296
Email: jasonnd@hotmail.com

Wireless Motorised IP Surveillance Camera. White In Colour - Control from your mobile phone/tablet/pc when out of the home - ideal for home security, baby monitoring, has sound and remote recording etc BNIB - £25 Price includes post and packing.
Email:omendata@gmail.com

Dell Inspiron 660 Intel i5 QUAD CORE with ACER 23 Inch LED monitor. AS NEW. Operating System: Windows 8.1. MPN:620MT. Memory (RAM): 4 GB. Hard Drive: 1TB. Processor Type: Intel Core i5. Primary Drive: Optical DVD+/-RW, Processor Speed: 3.0 GHz, Features: Graphics Card GT620 1GB. Acer LED monitor 23" HD. £520
Tel: Hitesh Rao (01163) 198895

PRINTER CARTRIDGES. Suitable for Epson printer range T711 - T714. Work perfectly. 50 pence each, plus postage (brand new unused sealed). Over a dozen available.
Tel: (07541) 222678
Email: petedew@gmx.co.uk
PRINTERS T481-T486 6 multipack F.O.C. to good home, just pay postage £2. Perfect crisp printing etc.
Tel: Pete Dew (07526) 988594

INKJET CARTRIDGES suitable for Epson Printers T711 - T714 range, and T481 - T486 range. 79 pence each, plus postage. Work perfectly, good crisp printing quality.
Tel: (07526) 988594
Email: petedew@gmx.co.uk

Powered PCI Express x1 To x16 Riser Card Extension via USB 3.0 + Power Cable Adaptor. Allows you to add an extra Pci-ExpressX16 slot to your Pc converting an existing x1 slot to x16. Useful for adding an Extra graphics card to create a Crossfire triple configuration or for Bitcoin data mining up to 7 cards can be installed using these adaptors. Quality model - Brand new still boxed. £10. Price inc. P&P
Email:omendata@gmail.com

Laptop Removeable drive tray. Allows you to add an extra hard drive to your laptop by taking out the CD/DVD drive. This device inserts into the Cd/Dvd Empty Slot and holds 1 Hard Drive. Excellent Engineers Gadget - Great for data recovery or just beefing up your laptop. Two types available - standard Sata To Sata or Sata To Ide (Pata) Slot type. Brand New Still In Box. £20.
Email: omendata@gmail.com

Amstrad PCW 9256. In perfect working order including on-top printer with a few 3" disks. Offers.
Tel: John Adams (02088) 641202
Email: meeching@uwclub.net
2 HP Laserjet 3100 printer-fax-copier-scanners. In good working order. £25 each.
Tel: John Adams (02088) 641202
Email: meeching@uwclub.net

Lian Li PC-X2000 Computer Case. Supports mATX, ATX, eATX; hot swap SATA drives, six 3.5" & two 2.5" hot swap disc holders. Three 140mm intake plus two 80mm and one 140mm exhaust fans. £140.
Tel: Ian (01932) 856971
Email: a2345@btinternet.com
1.5TB SATA drive. Fully refurbished by government acknowledged company. All data taken off (some drives are still under Western Digital warranty) ONLY £40 including P&P
Tel: Dave Thomas (01942) 706572
Email: davethomas96@aol.com

1TB SATA drive. Fully refurbished by government acknowledged company. All data taken off (some drives are still under Western Digital warranty) ONLY £38 including P&P
Tel: Dave Thomas (01942) 706572
Email: davethomas96@aol.com

Blueberry I-MAC. Good condition, all in working order, £55.
Tel: (01386) 832758
2TB Western Digital SATA drive. Model WD2002FYPS 64mb cache, fully refurbished by government acknowledged company. All data taken off (some drives are still under WD warranty) ONLY £50 including P & P
Tel: Dave Thomas (01942) 706572
Email: davethomas96@aol.com

Motherboard Bundle. 2.4Ghz AMD Athlon XP 32bit CPU 512MB Ram 5xpci 2IDE LAN sound good for gaming, office work, surfing the net, watching movies generally a good all round system spec can slightly be changed if required please email or call me for a price.
Tel: David (01616) 888119
Email pcmadnessltd@yahoo.co.uk

750GB SATA drive. Perfect working order. Formatted ready to use. Only £25 plus £3 p&p. Genuine Windows XP with COAy can be pre installed for £10.
Tel: Dave Thomas (01942) 706572
Email: davethomas96@aol.com
4GB (2 x 2GB) of OCZ Reaper PC2 6400 ddr2 memory. Fast gaming memory, used but in excellent condition, £49.95 inc postage.
Email: baslake@blueyonder.co.uk

HP 5101 5102 5103 Netbooks and Notebooks. Lots of parts available down to the tiniest screw. Contact with requirements.
Tel: (01892) 833413
Email: fwfkent@gmail.com

Retro Commodore 64 with 1541 disktrive tapedeck. All in original boxes, mags. Pick up from Somerset. £75 ono.
Tel: (01278) 691606

Brand new USB brackets. Add 2 extra USB2 ports to your computer at little cost. Simple to fit cable connects onto the motherboard and uses a spare slot on the back of your computer. No drivers required. Please email or call for a price.
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk
6 P3/4 PC bases for sale. £100 the lot. All with XP. Must be collected.
Tel: (02387) 333212
Email: zen96403@zen.co.uk
MAC BOOK PRO A1151. Spares and repairs 17 " screen 2.16GHz Intel CPU looks in good condition screen appears to work. Please email or call me for a price and more information.
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

Six p3/p4 PC with XP. £100 the lot. Buyer collects. Get in touch for more information.
Tel: (02380) 733312
Email: zen96403@zen.co.uk

Socket 775 System. Coolermaster Case, audio + USB. Asus P5KPL-AM EPU E6600 CPU. 250 GB Hdd. DVDRW, ATI 5450. Boxes, drivers. Samsung 19" Monitor HDMI USB. Keyboard mouse. Windows 7 Professional SP1. £100 collect from Louth, Lincolnshire.
Tel: (01507) 602914
Email: flipinek@hotmail.co.uk

500GB SATA drive. 3.5" formatted ready for use. Software can be installed for an extra charge. Windows 7 extra £35 includes disk and certificate of authenticity. Only £23 including P&P.
Tel: Dave Thomas (01942) 706572
Email: davethomas96@aol.com

Vintage Apple Macintosh Classic II PC for sale. Complete with keyboard, mouse and microphone. Offers.
Tel: 07733 628986
Email 576924@tiscali.co.uk

AGP, PCI and PCI-e graphics cards. Please email or call me for a price.
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

2 x 2GB Samsung DDR3 pc3-8500 1066 SODIMM. 204 pin as new laptop memory. £15 inc postage to inland UK.
Email: jvital@mail2web.com

Dell OptiPlex 755 (80 GB, Intel Core 2 Duo, 2.33 GHz E6550, 1GB memory, DVD/CDRW) Ultra small form factor. Fantastic small and very fast computer. You will need to load the drivers. XP Pro or Vista Business can be loaded for an extra £10. The hard drive and memory can be upgraded for an extra cost. £70 plus £10 for delivery.
Tel: Dave Thomas (01942) 706572
Email: davethomas96@aol.com

Motherboard Bundle. 3Ghz AMD 64bit CPU 512MB Ram 5xpci 2xSATA 2IDE 1Gb LAN 6 channel sound firewire. Comes with driver CD and manual. Good for gaming, office work, surfing the net, watching movies, generally a good all round system. Spec can slightly be changed if required. Please email or call me for a price.
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

HARDWARE WANTED

Trying to breathe life back into an old machine? Why not submit a wanted ad and see if any of the thousands of computer enthusiasts who read the magazine each week have what you're looking for?

WANTED: Fractal Design Define XL full tower case. R1 (original version) in black.
Tel: (01670) 860146
Email: mm@tectron.co.uk

WANTED: Working Dot Matrix Printer in Good Condition. Thanks!
Email: printer.20.odaily@spamgourmet.com

WANTED: Acorn computer either an A5000 or A7000. Also book on teaching yourself binary.
Tel: (07817) 861011
Email: Johnhaviland73@gmail.com

WANTED: Corsair PSU cable bag. Please email me if you can.
Email: Paul@planetvoodoo.co.uk

Wanted: HD 3850 Graphics card, must be AGP. *Tel: (07817) 861011*
Wanted: Fully working mainboard for AMD socket AM2+/AM3, micro ATX size. Must use DDR2 RAM.
Tel: Brian Taylor (07570) 452557
Email: bmorgant@yahoo.co.uk

SOFTWARE FOR SALE

Do you have any old software that you simply don't use? Why not advertise is with us and see if anyone else can make use of it – you may well be surprised to find that someone is looking for exactly what you don't need!

Windows 7 Ultimate 32-bit version . NEW software and license (certificate of authenticity) 100% genuine and unopened software .ONLY £45 including P&P.
Tel: Dave Thomas (07828) 982930 or (01942) 706571
Email: davethomas96@aol.com

Windows 2000 Professional. NEW software and license (certificate of authenticity) 100% genuine and unopened software. ONLY £15 including P & P.
Tel: Dave Thomas (07828) 982930 or (01942) 706571 Email: davethomas96@aol.com

Windows Vista Business. New and sealed. software and license (certificate of authenticity) 100% genuine and unopened. (Dell branded but will install on any machine) ONLY £15 including P & P
Tel: Dave Thomas (07828) 982930 or (01942) 706571 Email: davethomas96@aol.com

Windows 7 Home Premium 32 bit versions. NEW software and license (certificate of authenticity) 100% genuine and unopened software .ONLY £35 including P & P.
Tel: Dave Thomas (07828) 982930 or (01942) 706571 Email: davethomas96@aol.com

Cyberlink PowerDVD 12 Standard. Runs under Windows 8, 7, Vista or XP. Original CD with unused product key £7.50
Tel: Ian (01932) 856971
Email: a2345@btinternet.com

Nuance Omnipage 18. OCR Runs under Windows 8, 7, Vista or XP, Original CD with unused product key £25.
Tel: Ian (01932) 856971
Email: a2345@btinternet.com

Acronis True Image Home 2012. Bootable CD. Application runs under Windows 8, 7, Vista or XP. Original Acronis CD with unused product key £5.
Tel: Ian (01932) 856971
Email: a2345@btinternet.com

Windows 7 ULTIMATE 32 Bit and 64Bit DVD disks incl. SP1 This is my "Get Genuine Kit" from Microsoft not OEM. New install or legalise your copy with full Product Key. only £50 incl. reg. post
Email: Dave ochdgh@aol.com

Norton Family Premier 2.0. Runs under Windows 8, 7, Vista or XP, Original Symantec unused product key £15.
Tel: Ian (01932) 856971 Email: a2345@btinternet.com

Microsoft Office 97 Professional. Original disc with key £18 inc postage.
Tel: Andrew (01376) 512118

Windows XP Professional. New and sealed. Book, software and license (certificate of authenticity) 100% genuine and unopened. (Dell branded but will install on any machine) ONLY £15 including P&P.
Tel: Dave Thomas (07828) 982930 or (01942) 706571
Email: davethomas96@aol.com

Microsoft Office Small Business Edition 2003 with Business Contacts. Legitimate Office Small Office Business Edition comprising Word, Excel, Powerpoint, etc. Comes with small piece of OEM hardware and original license code (coa) £10 incl. delivery, cheque or PO. £10.50 by Paypal.
Tel: (07794) 528857 Email: it_central@ntlworld.com

Norton Utilities 16 for 3 PCs. Runs under Windows 8, 7, Vista or XP, Original Symantec CD with unused product key £12.50
Tel: Ian (01932) 856971 Email: a2345@btinternet.com

Dell Windows XP Pro SP2 Reinstall Original Cd. Allows You To Restore Your Dell PC / Laptop Without A Licence Key. Brand New Still Packed. £10. Includes p&p.
Email: omendata@gmail.com

HP Windows XP Pro SP2 Re-Install Cd. Allows You To Restore Your HP PC / Laptop Without A Licence Key. Brand New Still Packed. £10. Price includes p&p.
Email:omendata@gmail.com

SOFTWARE WANTED

Wanted: LG GSA 2164 D software disc to replace broken original.
Tel: Glen Fremantle (01387)248976
Email:bldamsys@yahoo.co.uk

Wanted: Windows 98 CD ROM operating system with boot disk, instruction manual and serial number. Tel: Craig (07867) 930265 or 01912093677
Email: craigtin44@hotmail.com

IMPORTANT BUYING ADVICE

We work very hard to police our classified ads, and make them as secure as possible. However, please do your bit too and use the following guidelines:

• **Never - NEVER -** pay by bank transfer or post out cash, unless you know the trader already, or are sure it is okay to do so. Pay by cheque, Paypal, Nochex etc wherever possible.

• Be wary of anyone who insists on you paying by the above methods if in doubt, get us to check them out by mailing editorial@micromart.co.uk

• Keep copies of all correspondence

• When sending out goods, at the least obtain a certificate of posting from the Post Office

If you are in any doubt, feel free to send us a mail via editorial@micromart.co.uk.

Every year, thousands of successful transactions take place through our classifieds, and that's just how we like it.

Help us help you keep them one of the safest and most secure places to buy and sell computer kit.

ASK AARON

Meet Aaron Birch. He's here to help you with any general upgrading, software and system building issues. He's got advice aplenty, and you're very much welcome to it!

Send your questions to:
Aaron Bich
Micro Mart
Dennis Publishing
30 Cleveland Street
London
W1T 4JD

Contact Aaron by email at:
aaron@micromart.co.uk

Please try to keep your queries brief and limit them to just one question per letter, simply so we can squeeze in as many as we can each week. Please include relevant technical information too.

Aaron

Classic Anchor

I have a HP 8740w laptop running Windows 7 for HP computers and I also have Classic Shell running. I do not have any of the software you recommended in your article (issue 1353, Window Locks).

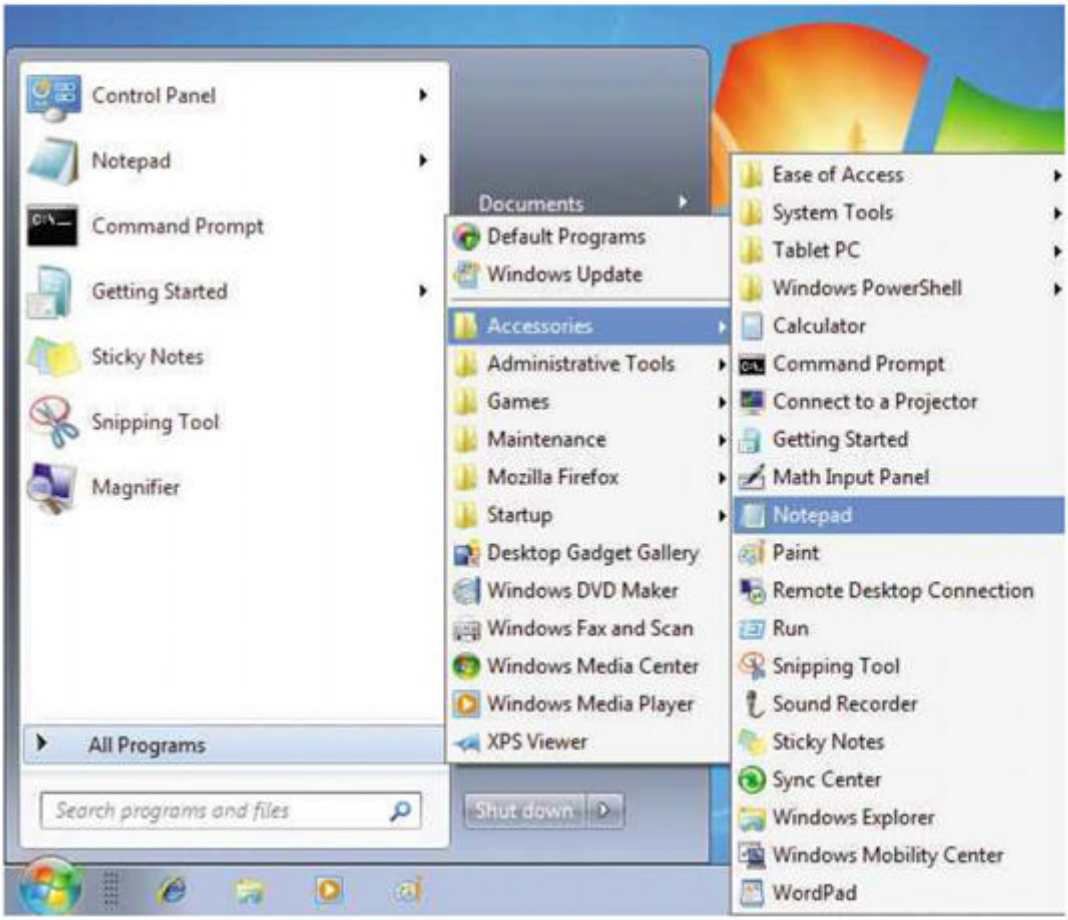
When I reopen a program, the window is always the same size and in the same place as it was when I closed it. Whether this is specific to HP computers or due to the presence of Classic Shell, I don't know, but if the latter, then Classic Shell could be an alternative to the programs on your list. Incidentally, Classic Shell is an excellent addition to Windows Explorer, and it lets me display file extensions that I couldn't persuade the native Win 7 Explorer to do.

Julian

Thanks for your suggestion, Julian. Classic Shell is an excellent program for taking full control of your Windows GUI and making it run as you with whatever cosmetic and functional changes you'd rather utilise, including classic looks, and it looks like it's also helped you solve the shifting window problem, which is great. Other readers should take note of this and give it a try.

With regard to your problems with file extensions, Windows file extensions can always be shown using Windows' own settings, without the need for extra software. All you need to do in Windows 7 is open Control Panel, and go to Appearance and Personalization, and go into Folder Options. Here, click the View tab, and under Advanced Settings, clear the option that says 'Hide extensions for known file types' and click OK. This will now show all file extensions for files. To hide them again, simply tick the option, and this will revert to the default of hiding them.

Classic Shell hides many useful options for those wanting to customise their copy of Windows



Broken Restore

I've been advised by friends to run System Restore on my PC (Windows 8.1), as I can use it to restore my PC to a working state if anything goes wrong. So far, I've not had any reason to do this, but I'm aware that many things can go wrong with a PC, so I'd prefer to be prepared. I have a couple of questions related to this, which I hope you can answer.

First, is System Restore a good option? Or should I instead focus on other things, such as anti-virus and other security programs?

Second, on trying to use System Restore, I found that I cannot, and simply get an error message.

The error reads 'C:\Windows\system32\SystemPropertiesProtection.exe Regular 0x80042302.'

Can you help? I look forward to any assistance you can offer.

Nev

System Restore is a very useful tool, and I'd certainly recommend you employ it to help you should you ever have any problems that require a rollback of your PC. That said, this won't replace other security or troubleshooting methods, so you'll also need to ensure you have decent anti-virus and malware protection, and perform other routine system housekeeping, such as defragmentations, driver updates, and other general tasks.

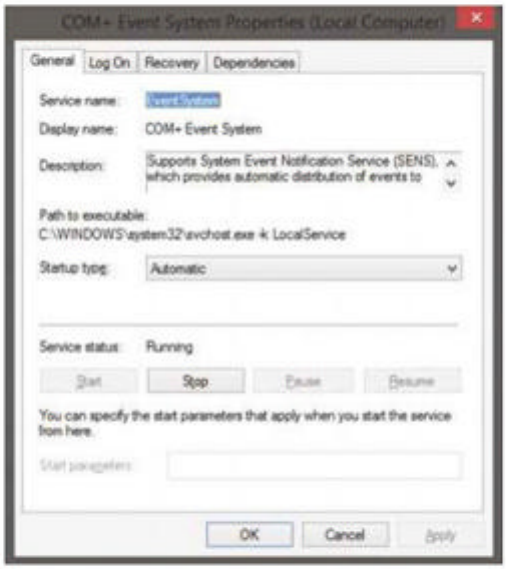
Taken on its own merits, System Restore is a tool you'll mainly be using when other options fail, but in these instances, you'll be very glad you have it around, so it's important to solve your problem, and re-enable it for you.

The error you're getting is one I've seen before related to System Restore, and with it came the Event Viewer message that pointed to a problem with the COM+ Event System service. More accurately, this service was actually disabled, hence the error message and the inability for the system to use System Restore.

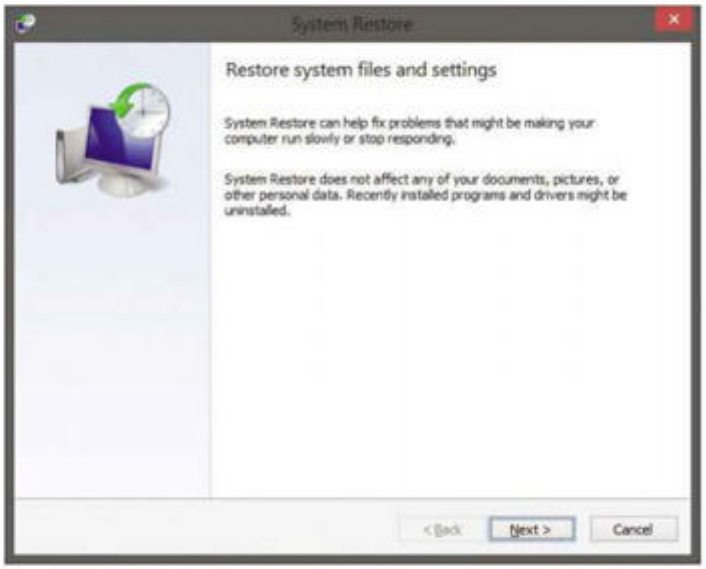
To solve this, you simply need to re-enable this service, which you can do by pressing Ctrl+Alt+Del and going into Task Manager. Once here, go into the Services tab and look through the list for EventSystem, with the description Com+ Event System. You'll probably see this listed as disabled, so right-click it and start it back up. Also, right-click it and select Open Services. In the new Windows, locate the COM+ Event System entry and double-click it. Make sure the Startup type is set to Automatic. This should ensure the service starts up properly as it should do.

With this service running, you should now be able to use System Restore as normal, and you can use it to create restore points that you'll be able to revert to should you need to in future.

➤ The COM+ Event System is an important entry for many services, including System Restore



➤ System Restore is just as important now as it's always been, even with Windows 8's increased stability



Windows Downgrade

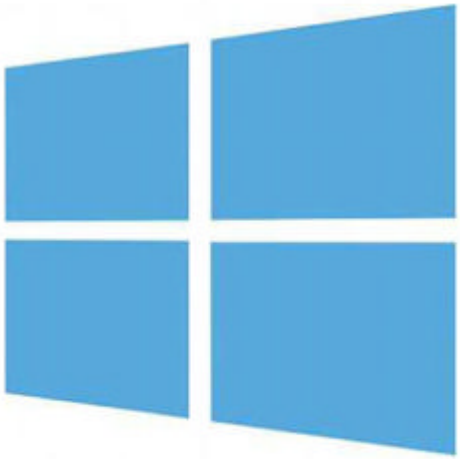
I've recently purchased a new PC, and it came with Windows 8.1 pre-installed, which I don't care to use. I'd rather go back to using Windows 7, which is the OS on my previous system. I'm not sure how to go about this, as my new PC didn't come with an actual Windows 8.1 disc. I'm assuming that I simply format my system and then install from my old Windows disc?

Can you shed some light on this, as I'd like to make sure I'm doing things the right way?

Tim

Users who buy a PC with a copy of Windows pre-installed are eligible for a downgrade process, which Microsoft has made available, but by doing this you have to abide by the downgrade rights, which cover the legal matters concerning this move from the pre-installed OEM copy to a previous version.

*You can find full information about this at **tinyurl.com/p2uc6sf**, which goes through the rights, as well as details about which versions of Windows this all relates to. Basically, you need to follow the downgrade procedure listed here, and once you do this, you'll be able to install the older version, which obviously has to be legitimate and have a licence key. If this key has already been activated online, you'll probably need to contact Microsoft, the details of which are also found on the above page.*



If you do decide to downgrade, I'd strongly recommend you first check the website for your computer manufacturer and the various hardware components within to make sure there are Windows 7 drivers for everything. The last thing you want is to downgrade, only to find that your new PC has components that aren't compatible with older versions of Windows. Also be sure to check that any OEM software for your new system is available and compatible with Windows 7, otherwise you'll lose some of the extra software you got with the PC.

➤ If you so wish, you can downgrade from Windows 8

ASK JASON

Meet Jason D'Allison, a veteran of Micro Mart's panel of experts. He's here to help with any technical questions, including anything to do with tablets or smartphones, as well as PCs

Send your questions to:
Jason D'Allison
Micro Mart
Dennis Publishing
30 Cleveland Street
London
W1T 4JD

Contact Jason by email at:
jason@micromart.co.uk

While we try to cover as many questions as we can, we regret that Jason cannot answer your questions personally, but he'll cover as many as he possibly can each week. Please ask one question per letter and remember to include the full specification of your computer, including its operating system.

Jason

Risk Assessment

I help out at a local charity. We're in the process of cataloguing a sizable archive of historical photos, and we'll also be scanning the best ones so that members of the public can access them. The charity has minimal funds, so I'm donating my old PC. The specs are listed below.

- CPU: Athlon 64 X2 3800+ (Socket 939)
- Motherboard: Gigabyte GA-K8NF-9
- RAM: 4× 1GB DDR400
- GPU: 128MB Matrox P650
- HDD: 120GB (SATA I)
- ODD: 12× DVD rewriter (IDE)
- OS: Windows XP

As you can see, the OS is currently Windows XP, which I know Microsoft has stopped supporting. I understand this could pose a security risk so, as the PC will be on the charity's network and connected to the Internet, would upgrading to Vista be any better?

If it would, it looks as though £10 or so on Ebay gets a genuine copy of either the Business or Home Premium version (Windows 7 is much more expensive). Which of these would you recommend? And is the PC even Vista-ready as it is?

Harry, Gmail

Very wise, Harry. Very wise. Putting an XP machine on the Internet these days is a no-no unless there really is nothing you're bothered about losing or being compromised – and you aasking the question in the first place leads me to suspect that's not the case here. Vista is a vastly safer prospect, and under the extended-support programme, Microsoft has promised to plug security holes until 11th April, 2017. With SP2 and all subsequent updates, Vista is actually a pretty nice OS.

The major concern is hardware support. Can you get the drivers? Well, Windows 7 would possibly cause a few headaches, but with Vista you'll be home and dry. Below is a list of download links I've put together for you. I'm good like that.

- *nForce 4 chipset:* ***bit.do/22PX***
- *Realtek ALC850:* ***bit.do/22Qx***
- *Matrox P650:* ***bit.do/22Ri***

Vista itself should have drivers for everything else, but if the integrated LAN port doesn't play ball, and if the charity actually needs it, Windows Update should sort that out. Of course, to run Windows Update you'll need an Internet connection, so temporarily you might have to shove in a cheap wi-fi card and get the machine in range of a friend's router. Or you could persuade someone to download and burn a copy of the ever-popular DriverPack Solution, which you can get from ***drp.su****.*

Business or Home Premium? I doubt it matters, Harry, but whichever you decide, I recommend opting for the 64-bit flavour. Your hardware supports it and if nothing else you'll have access to the whole of that 4GB of RAM. Under XP – I assume the machine's currently running the usual 32-bit version – you're restricted to 3GB and a bit. Business has more features than Home Premium – Remote Desktop Services, Group Policy, Complete PC Backup, and so on (see ***bit.do/23hJ*** *for the full list of version differences).*

Only you know if the charity needs these, but I suspect not in all honesty. By default, Business also doesn't have any games installed, but they can be added easily from the setup disc if anyone fancies a blast of Chess Titans *(or the even better* Comfy Cakes*, which is great. Windows Media Player is missing, too, but that can be replaced with a freebie such as VLC (****bit.do/23ix****).*

Probably the biggest issue with Windows 8.x is the absence of Comfy Cakes

Surmon On The Mount

My last couple of PCs have been Intel-based, and even though the Core i5 rig I've got now does everything I need, I'm bored. I want to build something new, and just for the sake of change I've decided to go with AMD and Socket AM3+ (I realise I'm unlikely to see any performance benefit). There are bargains to be had on second-hand FX chips, but most don't come with a cooler. I've got a couple of decent coolers from a long-dismantled AM2 system – any chance these would fit?

S. Lee, Staffordshire

The motherboard retention frame for AMD chips hasn't changed much since the launch of Socket 754 (way back in 2003, the time that followed the Jurassic period). Amazingly, then, coolers and boards for Sockets 754, 939, 940, AM2, AM2+, AM3, AM3+, FM1, FM2, and FM2+ are generally interchangeable. Remarkable. Of course, ensure the cooler you're fitting meets the chip's thermal needs. Don't fit a model designed for a 62W Socket 754 Sempron to a 125W Socket AM3+ FX! Also, bear in mind that old coolers, even if new and sealed, might have deteriorated over time, particularly in regard to the bearings.

There's a catch, though. The above compatibility applies only when the motherboard retention frame is actually used. All stock AMD coolers use it, as do many inexpensive after-market models. Many top-end jobs require the frame to be removed, though, along with the metal strengthening plate underneath. The holes left behind allow a proprietary bracket to be bolted in place.Boards for Sockets 754, 939, and 940 have two such hole, while later platforms have four, and none of those align with the two on the earlier platforms.

The upshot is that, unless the manufacturer has provided an updated bracket, is that a pre-AM2 cooler won't fit on a later board and a later cooler won't fit on a pre-AM2 board. In your case, my friend, you intend to use an AM2 cooler on an AM3+ board, so you should be fine. To round the subject off, though, it's worth noting that Socket AM1, AMD's most recent platform, employs an all-new system.

Zalman's CNPS9700 LED is nearly ten years old (and deserves a spot in an art museum), but amazingly it's still compatible with most modern sockets

Port Short

I've recently built a low-cost gaming system based around a Core i3 and an Asus H81M-C. The case is the Zinc 200 from Element Gaming, and this has two USB 2.0 ports, a USB 3.0 port, and a card reader. I don't seem to be able to connect all these up, though, as the Asus has had too many corners cut.

For starters, the USB 3.0 plug doesn't fit anywhere, unless it goes on the TPM header? That looks the right size. At the moment I've got all three ports connected to the board's USB 2.0 headers. But, by doing this, I've found the card reader doesn't work – this needs a header of its own. Is there a workaround? I'm quite disappointed with this board – I expected better from Asus.

Cashel, TalkTalk

Element Gaming's Zinc 200 is a super budget gaming case. Powder-coated interior, side window, base-placed PSU mount, three half-decent fans (two with blue LEDs), built-in card reader – a great choice for under £20, Cashel. It also looks like some sort of mechanised monster from a post-apocalyptic wasteland, and who wouldn't want that? However, if ***www.elementgaming.com*** *is any indication, cases are no longer in the company's product line, so current stocks could be the last.*

As you say, the case has three USB ports: two supporting USB 2.0 and fed by a 9-pin plug, and one supporting USB 3.0 and fed by a 19-pin plug. The 19-pin plug also has a 9-pin plug splitting off from it, which, as you've identified, is so that the USB 3.0 port can be used for USB 2.0 if the motherboard doesn't have a USB 3.0 header. And I'm afraid your Asus H81M-C is indeed such a motherboard. Forget the TPM header – that's for a Trusted Platform Module (see ***bit.do/23KL****, if you'd like to take a little time to read exactly what that's all about).*

You see, the H81M-C employs Intel's H81 chipset, and that supports two USB 3.0 ports and eight USB 2.0 ports. As there are two USB 3.0 ports already on the backpanel, a header on the board would be pointless. It's not corner-cutting on the part of Asus – it's simply a limitation of the chipset. To be fair, the board only costs about £39.

Regarding USB 2.0, as there are already four ports on the backpanel, there are only two headers on the board (each supporting two ports). So you have a problem, as the card reader needs one of those. That leaves just one header to hook up the case's three USB ports.

Clearly, as you suspect, that's not possible. You can either have the two USB 2.0 ports or the one USB 3.0 port (working in USB 2.0 mode) – or all three ports but no card reader.

Sadly, there's no squaring the circle on this one, Cashel. Unfortunately, Intel's H81 is what it is.

The Zinc 200 is worth every penny of its £20 asking price

Crowdfunding Corner

From the cheap to the expensive, you can find everything on Kickstarter. Here are two projects you can consider at either end of the pricing spectrum

Skiva UltraHD 4K

Connecting your phone to your TV often requires a lot more effort than it should, especially if you want to go bigger than HDMI allows and into into 4K territory. Acknowledging this as a gap in the market, the Skiva cable dutifully adds this capability: it's an Android-compatible video-out cable that does indeed support 4K resolutions, as well as being backwards compatible with 1080p.

The list of technologies supported is what makes this impressive: 4k resolutions, MHL 3.0 output, 5- and 11-pin MicroUSB and 7.1 surround sound. It's 6.5ft long, so you shouldn't have any trouble connecting your phone to your TV no matter how big your front room is, and the cable splits into an HDMI/USB socket supporting 10 watt power transfer, so it's capable of shifting enough juice to charge your phone or tablet too.

The project itself is a modest one with modest goals, and if you're quick you'll be able to pick up a cable for $18 (£12). The target is just $5,000, and it's more than halfway to that after just days of activity. SkivaTech has several successful Kickstarters under their belt, too, so it's likely it know what it's doing. The simplicity of the project means there isn't much further to take it – stretch goals aren't likely – but it also makes it seem achievable. Delivery is due in May 2015.

URL: kck.st/1CDdt52
Funding Ends: Sunday, April 26th 2015

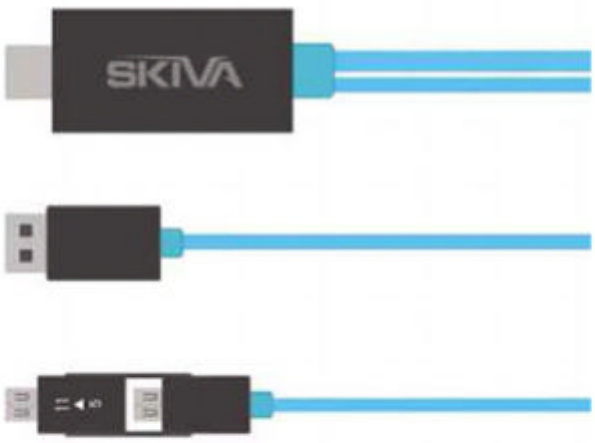
Abode

Home automation technologies are starting to take off, but until one genuinely hits the big time you're left sifting through Kickstarter to find one that's got the potential to work for you. Abode has taken a single idea – how can technology make your life simpler? – and built its home automation around that.

The project centres on a Gateway that runs the firm's own home automation OS, and can communicate with a number of devices. A motion-activated colour camera with infrared sensor and night-vision mode, door and window contacts that can monitor their open/closed status, a fully streaming video camera and remote/key fob, which can automatically arm and disarm the system when you arrive and leave. It's even got the ability to detect a wireless jamming signal! The system supports up to 150 devices in total so it'll cover even the biggest houses.

It isn't cheap, of course. The base package which includes a motion-camera, two door/window contacts, a key fob, the gateway system and access to the web/mobile apps retails for $399 (£270), but if you're early enough for the early bird price you can get it for $199 (£135). More expensive tiers add extra hardware (such as the IP streaming camera at the $384/£260 tier), but it's safe to say that even with discounts this one isn't quite priced at entry-level.

URL: kck.st/19lcL06
Funding Ends: Friday, May 8th 2015



Disclaimer: Images shown may be prototypes and Micro Mart does not formally endorse or guarantee any of the projects listed. Back them at your own risk!

App Of The Week

Jelly Jump

David Hayward samples some delicious gelatine based gaming this week

We were on the search for a new game on our Android tablet the day, as we're a little bored now of the one we've been playing recently. Browsing the app store, though, can be rather daunting at times – what's good, what's terrible? And you can't always rely on other people's reviews in the description either.

However, we came across a rather splendid little game, one that's extraordinarily simple but infuriatingly addictive too: *Jelly Jump*, from Ketchapp Games.

Mmmmm... Jelly...

The idea is simple. A block of jelly is formed in a vat then unceremoniously dropped onto a platform. From there you have to tap the block of jelly to make it jump up to the next platform before the water below rises and drowns the poor thing.

It sounds easier than it is, and you'll soon come to appreciate a new level of frustration as you realise the platforms that appear above the block of jelly arrive at different times. So just when you think you've mastered the right sequence, the game goes and makes the next platform a little slower than before.

Inevitably, you'll end up mistiming the jump, and the jelly will either become trapped between the two ends of the platform as they come together or will be left stuck on the platform below and ultimately drowned.

As you progress through the game, you'll come across various blobs of leftover jelly, which act as an in-game currency for you to unlock new jelly forms with. There's also the occasional platform that will rocket you skyward for a short period, enabling you to have those vital few seconds for a second jump, should you mistime the previous one.

Needless to say, you'll soon come to appreciate the finer points of the game and its addictive nature.

However, the game did have one or two problems on our aging Galaxy Note. For one, it seemed to stagger once or twice during play, which made trying to time our landings a little more difficult than it needed to be. And we also found the tap often didn't register when we wanted it to, leading to the untimely death of our poor lump of jelly. Saying that, though, those problems could well be down to the tablet and not the game itself. We imagine it's a case of try it and see how it works on your device.

Conclusion

A very entertaining waste of a number of minutes. The fact that you're likely to be swearing under your breathe on the commute to work may well raise an eyebrow or two, but then the other passengers may be playing it as well.

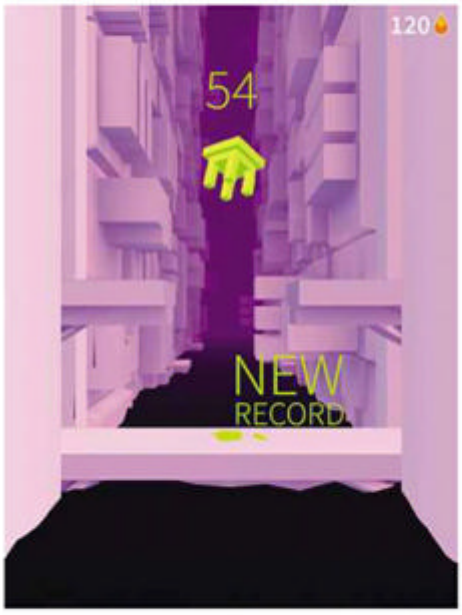
All in all, not a bad game. Fun, addictive, challenging and simple. What any decent mobile game should be, really. **mm**

Features At A Glance

- Free.
- Very addictive.
- Quite challenging.
- Jelly! Everyone likes jelly.

Bounce that jelly up through the platforms

Save blobs of jelly to buy different shapes



Yeah, like we actually reached level 54

Logging Off

Election fever has descended on us again. Or rather those in TV news would like us to think it has, in preference to the total apathy that embraces many when confronted with political choices.

Who can blame the public when mostly faced with a disturbingly stark call between two rich blokes for PM, neither of whom has ever experienced a real job?

Personally, I'd like to 'empty chair' myself from these proceedings, but I'm resigned to the media scum that these transitions generate.

I'm also old enough to be really cynical about the differences between parties and their genuine scope for change once in power.

But before I'm deluged with complaints from those reading economics at Corpus Christi College, my only reason for mentioning all this is that whatever the outcome in May, some real changes are happening at Westminster.

Once parliament sits again, all 650 elected members will be issued with their official parliamentary technology, which for the first time includes an Apple iPad Air 2. If you're wondering if that might be an expensive choice, given it's tax payers' money they're spending, you'd be right to be concerned.

It's estimated that the deployed units and replacements over five years will cost £1m – at least that's what they've budgeted. Looking at those numbers, they roughly equate to getting the biggest storage model (128GB wi-fi and cellular) and expecting them to last roughly 2.5 years before they're replaced.

They could have halved that cost by using Android or even Windows tablets, but apparently Apple products swung it because they were "competitively priced" (really?) and security was an important factor.

I'd love to hear the technical arguments as to how these two things are believable, but I suspect the real reason for this choice is that 209 MPs already use these fashion accessories, and therefore it was easier to get them signed off.

The theory, as yet untested, is that the expense of these devices will be easily offset by the reduction in print costs that providing digital document access will allow. But, as I discovered a long time ago, many people took to using computers not as a means to save trees but as an effective mechanism to kill scores more.

If you still have a dinosaur living in your office that accepts emails and

EDITORIAL
Editor: Anthony Enticknap
theeditor@micromart.co.uk
Designer: Kevin Kamal
Bonus John: John Moore
Contributors: Mark Pickavance, Shaun Green, Jason D'Allison, Joe Lavery, Sven Harvey, Simon Brew, Shaun Bebbington, Ryan Lambie, James Hunt, Mark Oakley, Ian Jackson, Roland Waddilove, Prawns, Eggy Bread, Sarah Dobbs, David Hayward, Leo Waldock, Ian McGurren, Aaron Birch, David Briddock, Ian Marks, Craig Grannell, Kevin Pocock

Caricatures: Cheryl Lillie

ADVERTISING
Group Ad Manager:
Andrea Mason
Tel: 020 7907 6662
andrea_mason@dennis.co.uk

Sales Executive:
Finan Tesfay
Tel: 0207 907 6898
finan_tesfay@dennis.co.uk
Sales Executive:
Karl Taylor
Tel: 0207 907 6706
karl_taylor@dennis.co.uk
US Advertising Manager
Matthew Sullivan-Pond
matthew_sullivan@dennis.co.uk

MARKETING
Marketing Manager:
Paul Goodhead
Tel: 0207 907 6393

PRODUCTION
Production Assistant:
Maaya Mistry
0207 907 6079
maaya_mistry@dennis.co.uk
Digital Production Manager:
Nicky Baker

SUBSCRIPTIONS
Save 24% on the cover price:
£77.50 for 51 issues by credit card.
Visit ***subscribe.micromart.co.uk***
Tel: 0845 126 1014

ONLINE SUBSCRIBER SERVICE
www.subsinfo.co.uk
Change your address, renew subscription or report problems.
UK Subscriptions: **0844 844 0082**
micromart@servicehelpline.co.uk

NEWSTRADE SALES
Newstrade Director:
David Barker

DENNIS PUBLISHING
Group Publisher:
Paul Rayner
paul_rayner@dennis.co.uk
Managing Director:
John Garewal
Group Managing Director:
Ian Westwood

COO: Brett Reynolds
CEO: James Tye
Company Founder: Felix Dennis

PUBLISHED BY
Dennis Publishing
30 Cleveland Street
London
W1T 4JD
Tel: 020 7907 6000
www.dennis.co.uk

PRINTING
Printed By: BGP
Distributed By: Seymour

Certified Distribution:
13,712 average copies
Jan-Dec 2010

then has his secretary print them out to file them, you have my deepest sympathy. I'm sure a stubborn core of MPs will refuse to use their free toys and only accept printed documentation, torpedoing the cost saving exercise from the outset.

There is also a fine irony in parliament further lining the enormous pockets of a company that paid just £11.4 million in corporation tax in 2013, on sales that have been estimated at £10.5 billion in the UK.

My own assessment is that the expenditure is only likely to encourage our representatives to play *Candy Crush Saga* while making noises like sugar enhanced toddlers during PMQs.

As for the security assertion, I expect that to be blown out of the water before the summer recess, when MPs start reading tweets they've not told their PAs to write and replies to emails they don't recall sanctioning.

This therefore could well be the point where the digital age delivers the reality check that many in politics just aren't prepared for.

Mark Pickavance

LAST WEEK'S CROSSWORD

Across: **1** Hero, **3** Mothball, **9** Placebo, **10** Demos, **11** Enhancements, **13** E-Sharp, **15** Castor, **17** Psychometric, **20** Latch, **21** Modular, **22** Paginate, **23** BSOD.
Down: **1** Happened, **2** Reach, **4** Orogen, **5** Hidden Agenda, **6** Admit It, **7** List, **8** Leonard Cohen, **12** Brick Red, **14** Hashtag, **16** Format, **18** Rules, **19** Blip

DISCLAIMER
The views expressed by contributors are not necessarily those of the publishers. Every care is taken to ensure that the contents of the magazine are accurate but the publishers cannot accept responsibility for errors. While reasonable care is taken when accepting advertisements, the publishers cannot accept any responsibility for any resulting unsatisfactory transactions.
By the time you read this, Easter will have been and gone, but as we write, there are still a few days left to go. Not that it's stopped us opening a few eggs early and getting down to some serious chocolate chomping action. Yes, we know Easter isn't supposed to be about confectionary, but to us it is. It's a great big festival of chocolate, one that brings joy to us each and every year, and during which it's okay to spend ridiculous amounts of money on a relatively small amount of this cocoa-based treat simply because it's shaped like a rabbit. So far, we've put away a Cadbury Flake egg (and the Flakes) and a foot-high chocolate bunny from Thorntons. Now we're just taking a bit of a break before the serious chocolate eating begins. We know it wouldn't be healthy to just keep on eating chocolate from now until the end of Easter, so until the big day we're going to eat ice cream instead. And bacon. All the most important food groups basically.

THIS WEEK'S CROSSWORD

Across
1 A large international exhibition. (Abbr) (4)
3 A type of rotary electrical transformer used for measuring degrees of rotation. (8)
9 The area beyond the suburbs. (7)
10 Allowing light to pass through. (5)
11 A style of art and sculpture characterised by the highly detailed depiction of ordinary life with the impersonality of a photograph. (12)
13 A simple device for calculating, consisting of a frame with rows of wires or grooves along which beads are slid. (6)
15 Limited function, but working version of something created for testing or demonstration. (4-2)
17 Situated between vowels; immediately preceded and followed by vowel sounds, as, p in occupy, d in idea, etc. (12)
20 Find a solution by calculation, algebra or detailed analysis. (5)
21 Combining audio and video such that the sound is synchronised with the action that produced it, especially the speaker's mouth with the sound of their speech (3-4)
22 Less wide. (8)
23 Evidence that helps to solve a problem. (4)

Down
1 A person or thing serving as a typical example or appropriate model. (8)
2 A small planetary body orbiting the sun, discovered in 1930 by Clyde Tombaugh. (5)
4 Someone who regularly buys or sells through the most popular online auction website. (6)
5 Electronic equipment that provides a visual image of varying electrical quantities. (12)
6 Afrikaans for 'Get lost' (7)
7 Not found in large numbers. (4)
8 -273.15 Celcius or -459.67 Fahrenheit. (8,4)
12 A word used to describe planetary orbits in the Ptolemaic system. (8)
14 Shaped like a ring. (7)
16 New asymmetrical, cooperative/competitive shooter video game, developed by Turtle Rock Studios and published by 2K Games for Windows & PS4. (6)
18 Steadfast in allegiance or duty. (5)
19 International standard serial number, assigned to many publications such as newspapers, magazines, annuals and series of books. (Abbr) (4)

In Next Week's Micro Mart*

- Special issue!
- 11 essential tips for upgrading
- Repurposing old hardware
- Tracking technology price trends
- What are KVMs, and what can they do for you?
- Plus the usual mix of news, reviews and advice

* May be subject to change

©2015 Cisco and/or its affiliates. All rights reserved. Intel, the Intel logo, Xeon, and Xeon Inside are trademarks or registered trademarks of Intel Corporation in the U.S. and/or other countries.

THE INTERNET OF EVERYTHING

presents

the last queue

We're building the Internet of Everything for business. With UCS Server solutions providing data centre performance everywhere, mobile applications and analytics keep queues short and customers happy. Let's confine queueing to yesterday.

See how at cisco.co.uk/thelastqueue

CISCO

TOMORROW starts here.

Cisco UCS with Intel® Xeon® processors

intel inside XEON

microdream ltd

Quality PC Laptops and Components

Microsoft AUTHORISED Refurbisher

EDITOR'S CHOICE micro mart

ThinkCentre

- Quad Core i5-2400 3.1GHz
- 4-16GB Memory
- Solid State Drive as option
- Genuine Windows

from £239.90 inc VAT

Scan me with your smart phone

Gaming ready PCs

We offer the most affordable Gaming Desktop Computers

from £139.90 inc VAT

Gaming advanced PCs

- Quad Core Processors
- Huge Memory RAM
- GTX 750 Ti Graphics
- Genuine Windows 7

from £219.90 inc VAT

Refurbished Computers are helpful to families, students, businesses and good for the environment!

iPad with Retina display

Just as stunning. Twice as fast.

- 4th Gen
- WiFi
- iOS 8.1

Scan me with your smart phone

£219.90 inc VAT

intel inside CORE i5

Windows 7 Professional

lenovo. FOR THOSE WHO DO.

£199.90 inc VAT

- CORE i5 2.40GHZ
- 4GB DDR3
- 160-320GB
- 14.1" WIDESCREEN

Scan me with your smart phone

Call 01803 269 861 or

Visit our store

MICRODREAM.CO.UK

Go Online for the latest offers!

Our customers love us!

★★★★★

We have loads of great customer reviews

Trustpilot

FREE

UK Delivery on all orders